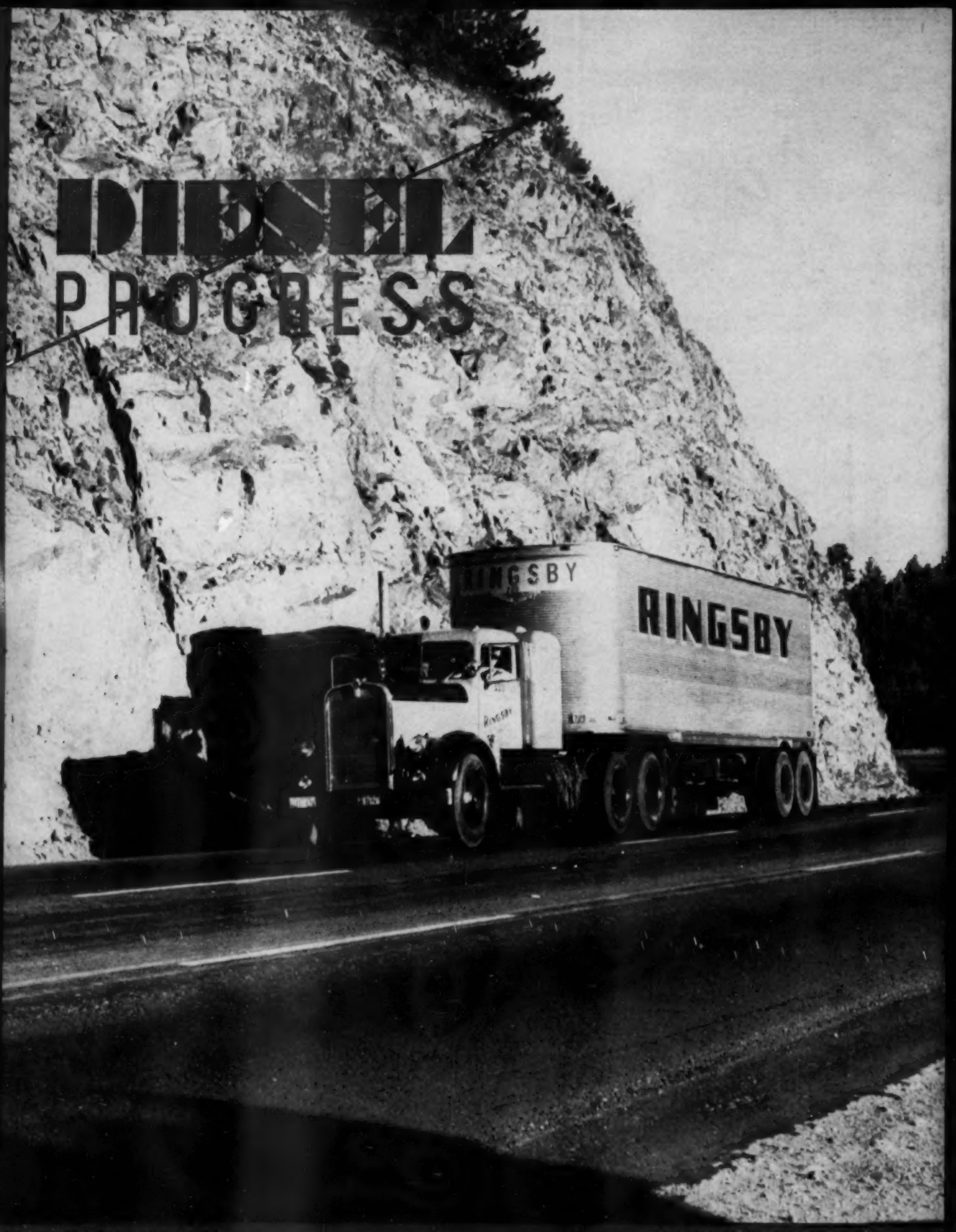
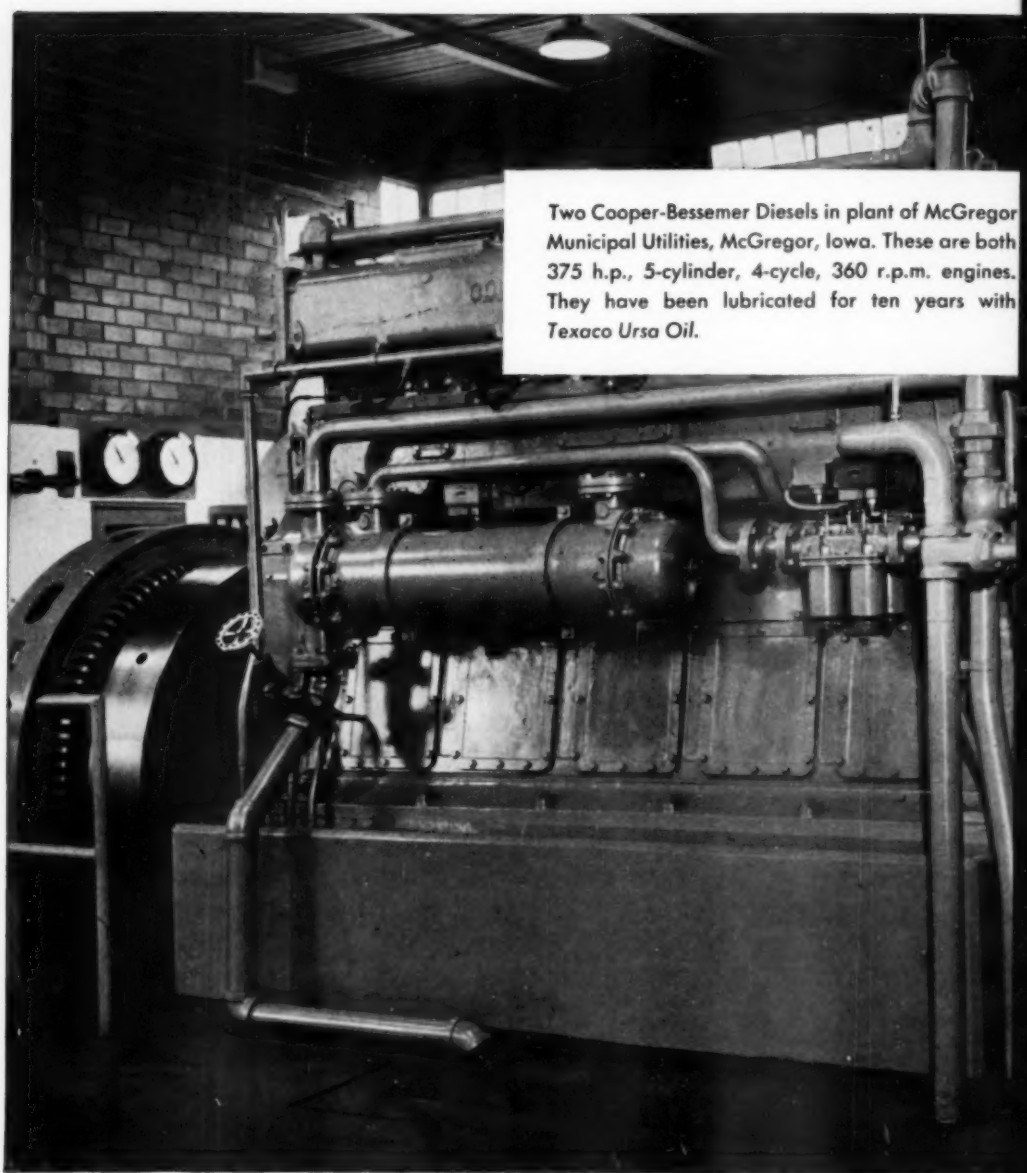
# DIESEL PROGRESS




FIVE DOLLARS PER YEAR

JUNE, 1952

FIFTY CENTS PER COPY



Two Cooper-Bessemer Diesels in plant of McGregor Municipal Utilities, McGregor, Iowa. These are both 375 h.p., 5-cylinder, 4-cycle, 360 r.p.m. engines. They have been lubricated for ten years with *Texaco Ursa Oil.*

TEXACO

DIESEL PROGRESS for June, 1952, Volume XVIII, No. 6. DIESEL PROGRESS is published monthly by Diesel Engines, Inc., 816 North La Cienega Boulevard, Los Angeles 46, California. Rex W. Wadman, President. Subscription rate: $5 per year, single copy, 50c. Acceptance under 34.64, P. L. & R., authorized.

# "We've used Texaco Ursa Oil for over 10 years and can state that it

# KEEPS DIESELS CLEAN ...KEEPS COSTS LOW"

***--says Raymond A. Trygg, Superintendent, McGregor (Iowa) Municipal Utilities***

Mr. Trygg states further regarding the outstanding performance of *Texaco Ursa Oil:* "When our Diesels were last opened up—for their first inspection in two years—they were found to be clean and there was no measurable wear on pistons, rings, liners or bearings."

Because of the exceptional engine cleanliness assured with *Texaco Ursa Oil,* operators everywhere get longer parts life, lower maintenance costs, less fuel consumption, lube oil economy. Latest annual figures, for example, show that McGregor gets 12,469 h.p. hours per gallon of *Texaco Ursa Oil.*

Whether you're operating Diesel, gas or dual-fuel engines, there is a *Texaco Ursa Oil* that is exactly right for the size and type of your engines, and your particular operating conditions. Leading engine builders approve *Texaco Ursa Oils,* and they are easily America's favorite. In fact—

*For over 15 years, more stationary Diesel h.p. in the U.S. has been lubricated with Texaco than with any other brand.*

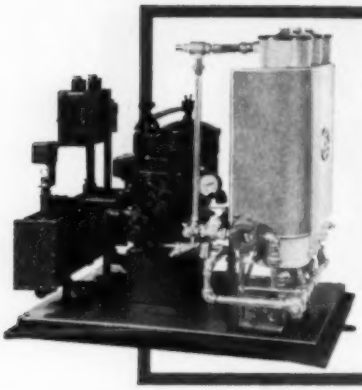
Let a Texaco Lubrication Engineer help you keep your Diesel efficiency high, your costs low. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

**URSA OILS** FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES

*Faithfully yours* 50 *for Fifty Years*

# HOW THE DE LAVAL "PURI-FILTER" KEEPS YOUR OIL VISIBLY CLEAN

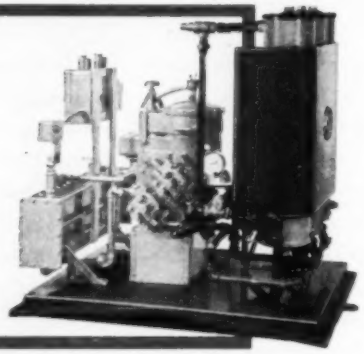


The De Laval "Puri-Filter" is the best means ever invented for keeping Diesel lube oil clean. It is a complete unit that combines centrifugal purification with micronic filtration.

The bulk of the solid impurities (and all water) is removed by centrifugal force, acting in the bowl of the De Laval Oil Purifier. When the oil is piped from the centrifuge to the filter cartridges it is dry and free of all harmful solids but it is still black from minute carbon particles.

The oil then passes through Fram Filcron Filter cartridges, and these take out the carbon and polish the oil. The oil emerges clean . . . practically transparent.

Filter cartridges last far longer when preceded by the centrifuge, hence the total cost of operating the De Laval "Puri-Filter" is low.



## *Note these Features*

**Removes dirt and water by centrifugal force • Filters out harmful carbon**

**Does not remove valuable additives • Cleans oil at moderate temperature**

**Speeds up inspection—crankcase is cleaner • Minimizes ring sticking**

**Increases bearing life • Saves labor—long runs without bowl cleaning**

**Increases oil life • No dirt . . . carbon . . . or water**

THE DE LAVAL SEPARATOR COMPANY
Poughkeepsie, New York 427 Randolph St., Chicago 6

•

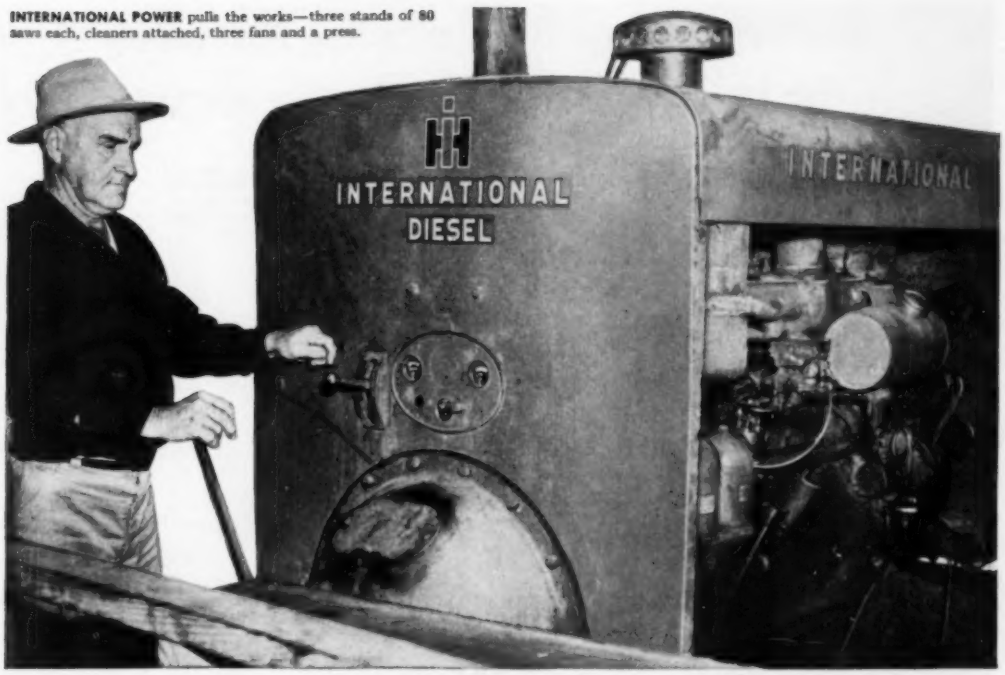
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

# DE LAVAL

**for most dependable power production**

LUBRICATING OIL PURIFIERS

**INTERNATIONAL POWER** pulls the works—three stands of 80 saws each, cleaners attached, three fans and a press.




# Bring on Your Big Loads!

## 180 hp International UD-24 provides power to spare

Working eighteen to twenty hours a day, during the ninety-day ginning season down at Patin Dyke, New Roads, Louisiana, Deville's Gin Company really needs steady power output.

With a concentrated work-load like that and 2,000 bales to gin a season, owner Joel Deville and ginner, J. W. McGinty, can't take a chance with their power supply. They got what they want in an International UD-24—and here's what they say about it:

*"In the past 3 seasons, we have found this UD-24 has power to spare while handling our complete gin operation. It has been a perfect power plant, always ready for a heavy load. This UD-24 has had only minor repairs. For our gin set-up, the UD-24 is the ideal engine."*

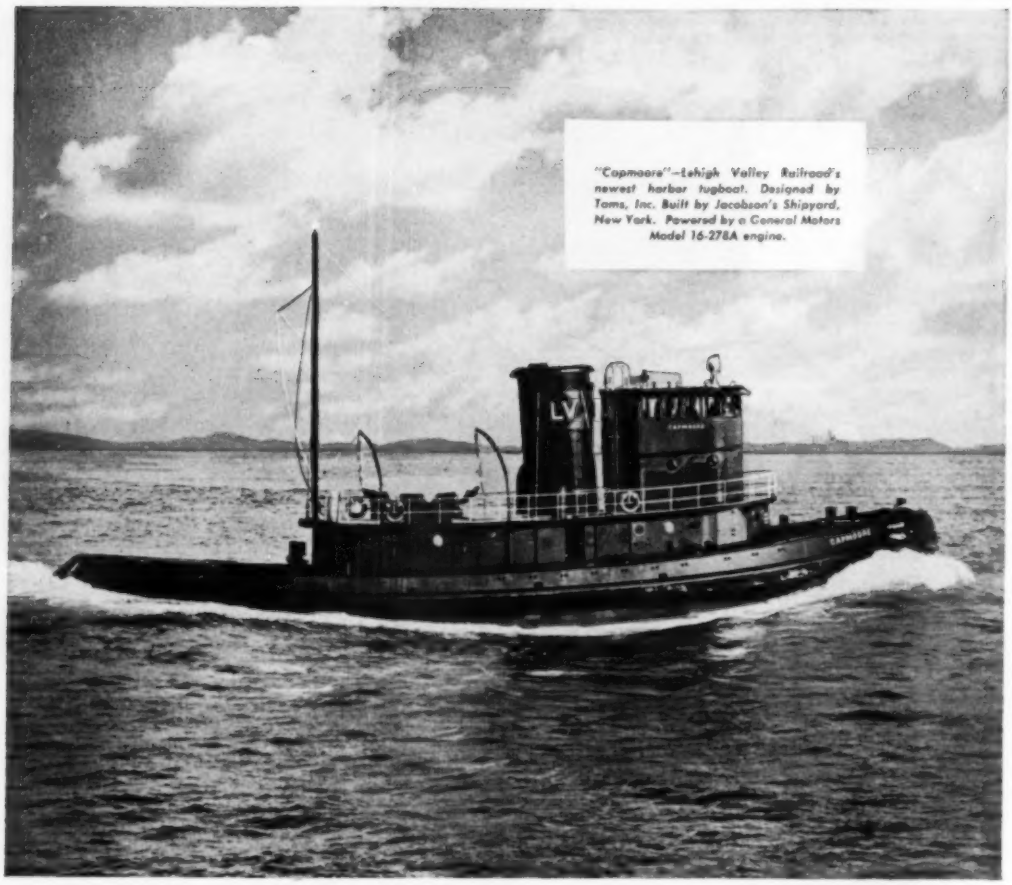
So bring on your big loads! Get the facts and figures on International power from your International Industrial Distributor or Power Unit Dealer.

**INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS**

INTERNATIONAL HARVESTER

**INTERNATIONAL**

**POWER THAT PAYS**



*"Capmoore"—Lehigh Valley Railroad's newest harbor tugboat. Designed by Toms, Inc. Built by Jacobson's Shipyard, New York. Powered by a General Motors Model 16-278A engine.*

# Now it's 5 for Lehigh

The "Capmoore" is the fifth General Motors Diesel-Electric powered tug to join the fleet of Lehigh Valley Railroad. Wherever towing service requires smooth, dependable, efficient power, GM Diesel-Electric Drive is first choice today.

*No Substitute For Diesel-Electric Drive*

**Cleveland Diesel Engine Division**

GENERAL MOTORS • CLEVELAND 11, OHIO

GM GENERAL MOTORS DIESEL POWER

*ENGINES FROM 150 TO 2000 H. P.*

**SALES AND SERVICE OFFICES**

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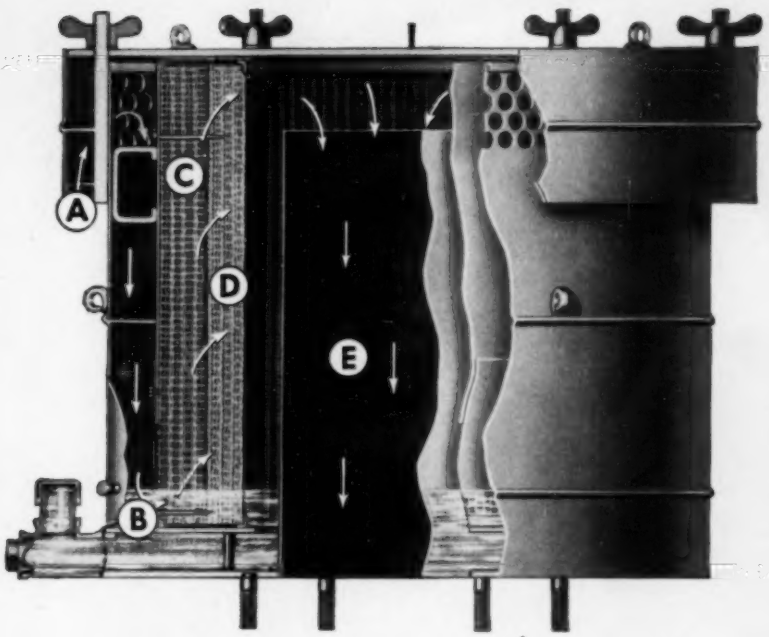
# How Air-Maze "Oil Bath" Filters scrub air clean in a pool of oil




By combining the principles of oil scrubbing action and baffle impingement filtration, the Air-Maze "oil bath" filter removes practically all abrasive dust and dirt from compressor and engine intake air*. Here's how it works:

(A) Equipment sucks dirt-laden air into filter, and skirt deflects it downward toward oil sump.

(B) Skirt, submerged in oil, effects oil seal which is broken by incoming air. Increase in air velocity beneath skirt causes turbulent scrubbing action of air by oil, removing bulk of dirt particles at low and intermediate engine speeds as well as high speeds. High filtering efficiency is maintained from idle to full throttle.

(C) Turbulent air showers oil evenly over diffuser screen, from which it is distributed over the filter element.

(D) Continuous oil washing action keeps filter element clean. Oil automatically returns to sump. Oil-covered filter element traps the smaller dust particles, removes entrained oil from air stream. Large area in cylindrical element design, insures low pressure drop.

(E) Dirt-free, oil-free air enters riser tube and equipment air intakes.

Air-Maze "oil bath" filters are available with a relief valve to protect against oil blow-out in free-air unloading compressors and large, slow-speed engines. Also available with backfire valve for 4 cycle gas engines. Air-Maze "oil bath" filters are used by leading engine and compressor manufacturers to make their products last longer, work better, require less maintenance. Call your nearby Air-Maze representative, or write Air-Maze Corp., Cleveland 5, Ohio.

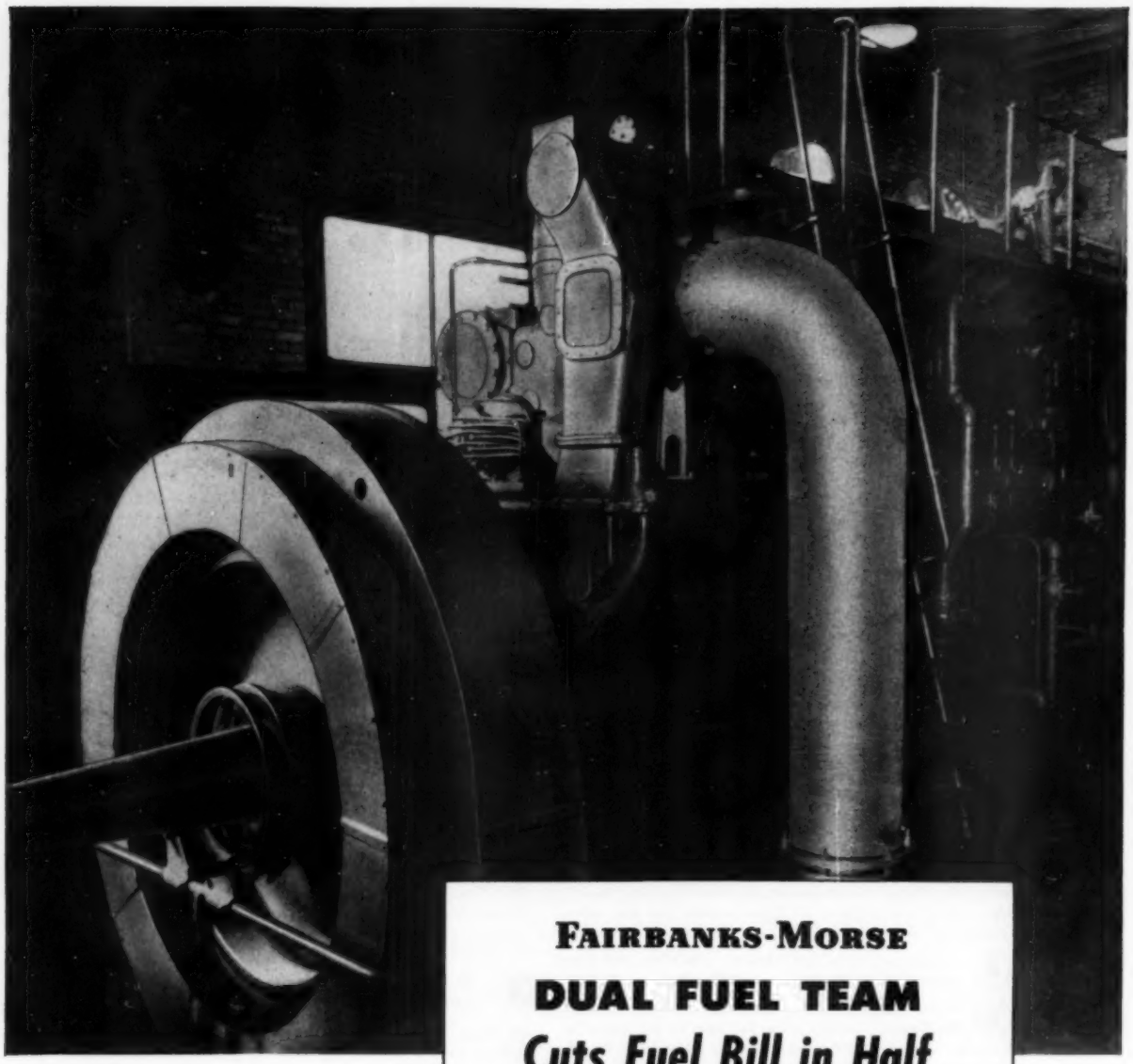
*based on laboratory tests using Standardized Fine Air Cleaner Test Dust.

*The biggest names in diesels are protected by Air-Maze filters*

AIR FILTERS
SILENCERS
SPARK ARRESTERS

**AIR-MAZE**
THE FILTER ENGINEERS

LIQUID FILTERS
OIL SEPARATORS
GREASE FILTERS



## FAIRBANKS-MORSE
# DUAL FUEL TEAM
## *Cuts Fuel Bill in Half*

Here at Benton, Arkansas, is the leader of the Fairbanks-Morse dual fuel team that cuts this municipality's fuel bill in half . . . saving $36,000 annually.

Installed as a dual fuel unit, this 2000 hp. Model 33 started plant conversion to full gas operation. Two other Fairbanks-Morse diesels were equipped with dual fuel accessories, and now the 4200 hp. team carries the entire load . . . at the low cost of only 3.36 mills per kw-h. All three engines can operate on gas or switch instantly to full diesels without dropping the load.

On standby duty are three more Fairbanks-Morse diesels, completing the team that assures this community low-cost, dependable power. Fairbanks, Morse & Co., Chicago 5, Illinois.

**Put Your Power Costs in Order with Fairbanks-Morse Dual Fuel Economies.**

**FAIRBANKS-MORSE,**

***a name worth remembering***

DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • ELECTRICAL MACHINERY • PUMPS • SCALES • RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

# Solves a fuel problem...

● The Center Municipal Power Plant of Center, Colorado, had a unique fuel problem. Because of the plant's rather remote location in the Rocky Mountains, the cost of transporting diesel fuel to the plant was extremely high. Resourceful Mr. Vail F. Shumaker, superintendent, worked out a plan for utilizing locally produced crude oil as a fuel. The poor burning quality of this fuel, however, led to trouble. Fuel soot was heavy and deposits formed in the plant's four engines. Rings began sticking.

A Standard Oil lubrication specialist was asked for advice. Upon his suggestion, the conventional lubricant used in the diesels was replaced in one engine by STANDARD HD Oil, a truly heavy-duty lubricant containing necessary additives. During the next few months' operation, this engine alone remained clean. It was evidence enough. The other diesels were switched to STANDARD HD. Despite severe operating conditions imposed by the poor burning fuel, STANDARD HD has kept these engines clean and protected during three years of service. It has made possible the use of the locally available fuel and thus effected a sizable saving for this power plant.

This plant's experience indicates how you can benefit through STANDARD HD and the services of a Standard Oil lubrication specialist. You can get those services easily and quickly by phoning your local Standard Oil (Indiana) office. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

**Pleased with** performance of STANDARD HD oil are J. J. Tyler of Standard Oil (left) and Vail F. Shumaker, Superintendent of Center, Colorado, Municipal Power Plant, who worked closely together to solve a unique fuel-lubrication problem.

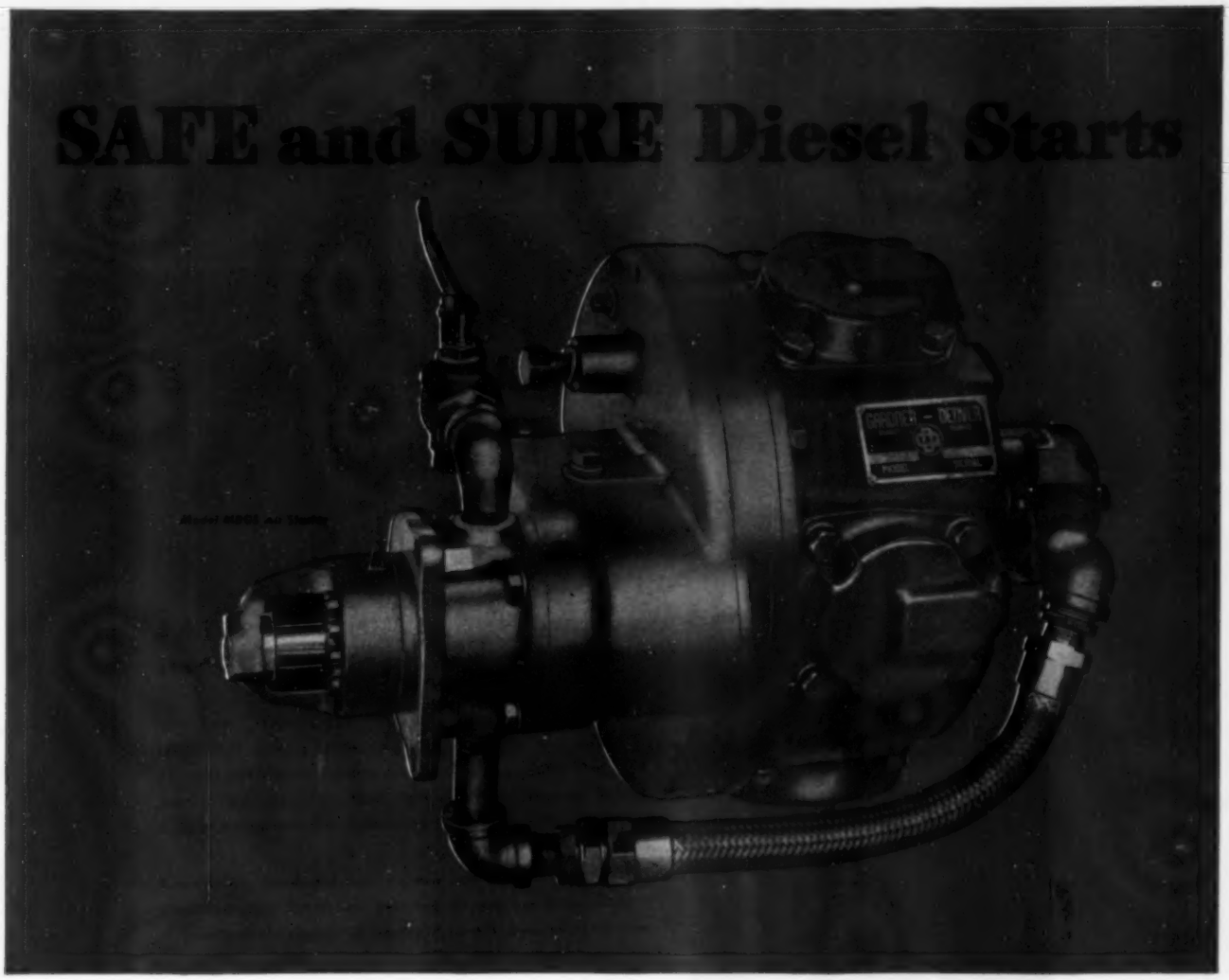
**STANDARD OIL COMPANY** STANDARD *(Indiana)*

*A Salute* to the Aluminum Company of America for their significant accomplishment in increasing the production of vitally needed aluminum by 70 per cent at its Point Comfort (Texas) Works.

We are proud that we supplied the 194 gas burning Radial engines totaling 350,000 horsepower for generating the power to produce aluminum in this—*the world's largest internal combustion engine power plant.*

NORDBERG MANUFACTURING COMPANY
Milwaukee, Wisconsin

# SAFE and SURE Diesel Starts



## ...with GARDNER-DENVER Air Starting Motors

Here's the modern way to start your diesel plant — the safe, sure way! Gardner-Denver Air Starters assure smooth, positive starts every time. They're powered by the high torque 5-cylinder radial Gardner-Denver Air Motor that handles high starting loads easily. The generous overlap of power strokes from the 5-cylinder motor provides a smooth flow of power for steady, even cranking.

*Gardner-Denver Air Starter installed on 240 h.p. diesel engine.*

### Won't abuse the ring gear

When you open the air throttle, pinion first engages the ring gear firmly — then full cranking power is applied. This automatic sequence prevents clashing gears — saves the ring gear from wear and strain.

### Does away with battery expense

Gardner-Denver Air Starters eliminate costly storage battery maintenance and replacement.

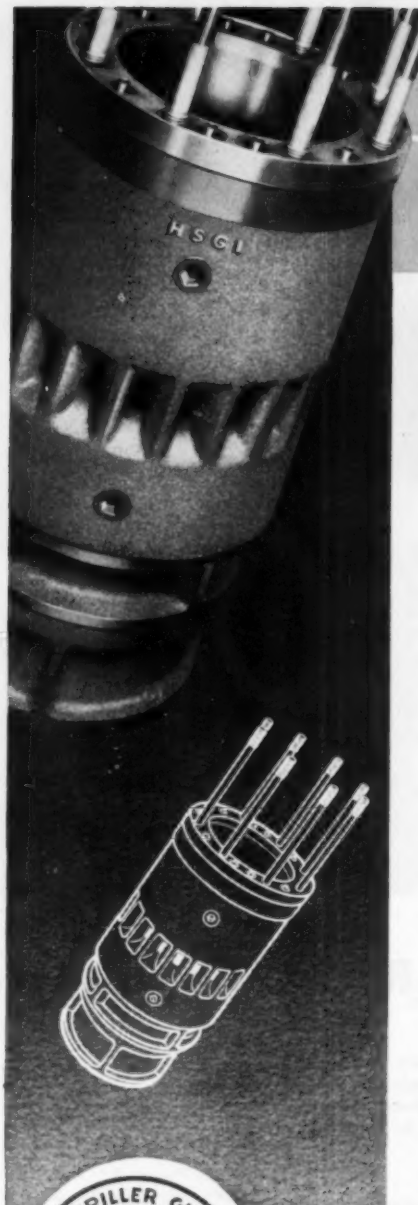
Send today for complete specifications on Gardner-Denver Air Starters for every diesel installation. They are available in several sizes and gear ratios.

SINCE 1859

**GARDNER-DENVER**

Gardner-Denver Company, Quincy, Illinois

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS




# GUN IRON

HUNT-SPILLER

## ...THE MODERN METAL for Diesel Engine Wearing Parts

Gun Iron castings, identified by the letters "HSGI", spell long, economical service for diesel engine wearing parts. Hunt-Spiller Gun Iron contains properties which provide unusual resistance to friction—extreme pressure—high heat—corrosion and erosion. These properties are recognized as vital for economical operation of diesel engine wearing parts.

The quality of Gun Iron is at all times completely controlled. It is produced in our own air furnaces, cast in our modern foundry and, when desired, the castings can be completely machined in our manufacturing plant.

Look for the letters "HSGI"—Hunt-Spiller Gun Iron—for Diesel Engine Wearing Parts.

## *The Civil War*

*The term Gun Iron dates to the founding of this company in 1810. During the Civil War at the South Boston Iron Works (opposite) two 11 inch caliber Dahlgren guns were cast, for the revolving turret of the famous Union ship 'Monitor. It will be remembered that the Monitor and the Confederate ship Merrimac were the first ironclads to duel in the Civil War—changing the entire course of naval history. The South Boston works also made some 200 Rodman guns for the Union Army, more than half of which were of 15 inch caliber and weighed 25 tons apiece.*

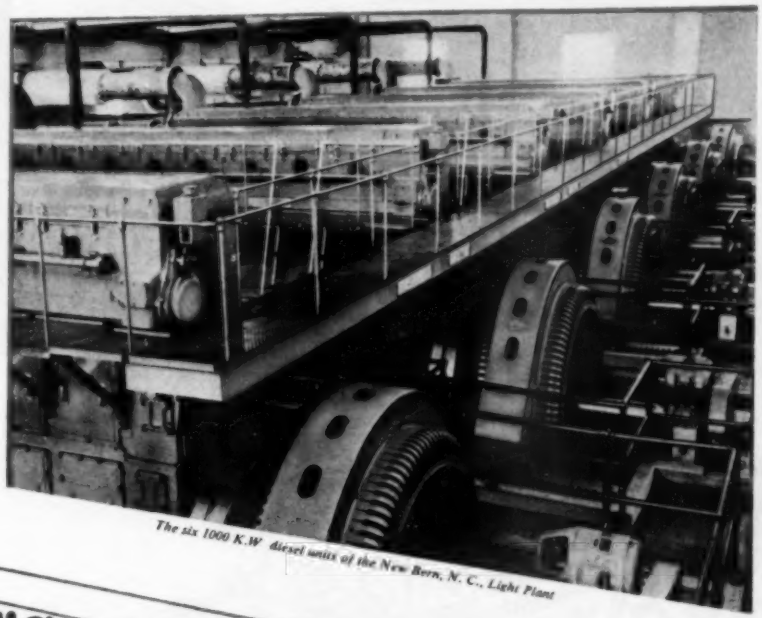
HUNT • SPILLER GUN IRON • AIR FURNACE PROCESS •

**HUNT • SPILLER**

**MANUFACTURING CORPORATION**

387 DORCHESTER AVENUE • SOUTH BOSTON 27, MASS.

*Canadian Representatives: Joseph Robb & Co., Ltd., 4050 Namur St., Montreal 16, P. Q.*



*The six 1000 K.W. diesel units of the New Bern, N. C., Light Plant*

# "Sinclair Diesel Lubricants cut consumption, keep engines cleaner"...

*New Bern, N.C., Light Plant*

One of the most efficiently run light plants in the country is located in New Bern, North Carolina. Six 1000 K.W. diesel units, expertly maintained and serviced, provide this pleasant community with electrical power.

W. B. Bartling, Director Public Utilities, says, "Since the opening of this modern plant in 1947, Sinclair RUBILENE® Diesel Lubricating Oil has been the principal oil used. For a short period of time, two prominent competitive brands were tried. However, the daily log and oil samples taken from the engines showed the merits of Sinclair over the other two – *cleaner* engines and *less* oil consumption."

As a result, this plant now uses Sinclair *exclusively*.

**SINCLAIR DIESEL LUBRICANTS save wear and replacement.**

For more details about Sinclair Diesel Lubricants – *and what they can do for you* – phone or write your local Sinclair representative or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

THE final result of this youngster's activity is entirely dependent upon his ability. That's the way we here at Erie Forge approach your problem—we take over completely—One Control—One Responsibility. Every step — from raw material to finished crank is accomplished here. Design, metallurgical control, casting, heat treating, forging and machining are under the constant watchful supervision of fine craftsmen with many years of experience. Consult with us on your next requirements for crankshafts, connecting rods or allied items.

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Simple
or
complex

# Precision in Bronze

FEDERAL Mogul

From print to product . . . in exact detail of alloy and physical dimension . . . plain or complicated . . . in wide variations of size and shape . . . rigid quality control. Complete research and engineering service . . . capacity now available. Your inquiry is invited.

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*SINCE 1899*

Products of our six plants include: Sleeve bearings in all designs and sizes; cast bronze bushings; rolled split-type bushings; bimetallic rolled bushings; washers; spacer tubes; precision bronze parts and bronze bars.

**FEDERAL-MOGUL**

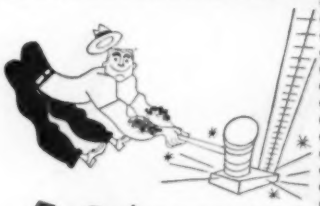
# CYCLAN

**The new Piston Ring material for tough service in heavy duty Diesel and Gas Engines**

**1** *Cyclan* IS TOUGH, WITH PLENTY OF TENSION, BUT NOT BRITTLE

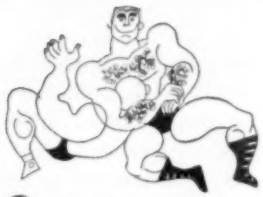
**2** *Cyclan* HAS TWICE THE BREAKAGE RESISTANCE OF ORDINARY IRON

**3** *Cyclan* RETAINS ORIGINAL TENSION UP TO 700° F.



**4** *Cyclan* WITHSTANDS IMPACT, HAMMERING, AND FLEXING

**5** *Cyclan* WITHSTANDS CONSIDERABLE DISTORTION WITHOUT LOSING SHAPE



**6** *Cyclan* RESISTS WEAR FAR BETTER THAN STANDARD RING IRON

AVAILABLE FOR RINGS UP TO 9" DIAMETER.

*Write for complete information*

SEALED POWER CORPORATION
MUSKEGON, MICHIGAN

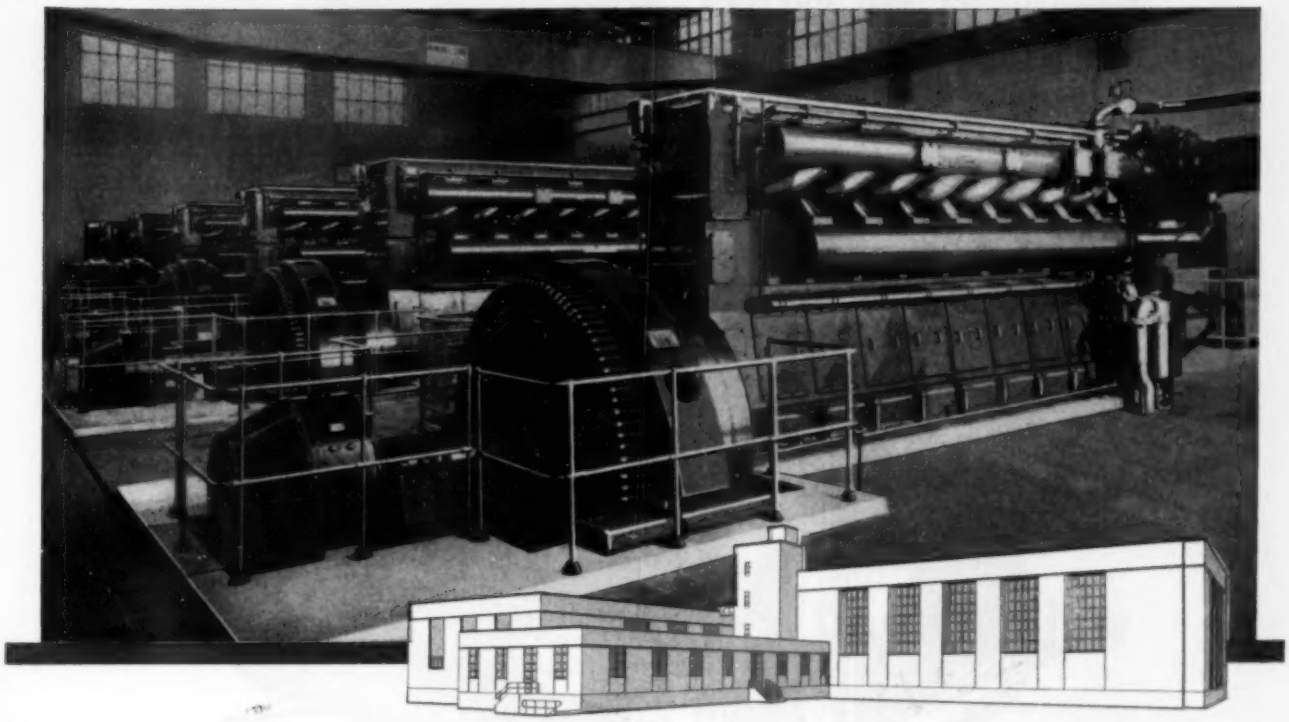
# Sealed Power

**PISTON RINGS · PISTONS**
**CYLINDER SLEEVES**

# Versatility and economy with

# DUAL-FUEL *Superior* DIESELS

## in New York's newest Sewage Treatment Plant



One of the most important applications of dual-fuel engines in modern municipal practice is the installation at New York City's Owl's Head plant where six 1125 KVA generators driven by Superior Dual-Fuel Engines provide all the power for sewage treatment of approximately 160 million gallons daily at the future peak volume.

From the standpoint of fuel economy the use of dual-fuel engines supplied with sludge gas obtained from the sewage treatment process is a major factor. It is estimated that 90% of the plant's power requirements, or 60,000 to 80,000 KWH per day, will be derived from this fuel source while the deficit will be made up with fuel oil automatically by means of the dual-fuel design when the volume of sludge gas is inadequate.

An important aspect of the plant design is that it is the sole source of power for all plant equipment. These Superior Dual-Fuel Engines with their direct-connected generators provide electric power for these highly integrated sewage treatment functions—

- **Sewage pumping**
- **Sewage aeration**
- **Plant lighting**
- **Gas and air compression**
- **Signal systems**
- **Ventilating blowers**

In addition, the entire plant is heated by a heat recovery system which functions automatically on demand.

The complete installation of the six Superior Dual-Fuel Engines was designed and constructed by engineers of New York's Department of Public Works, Frederick H. Zarmuhlen, P.E., R.A., Commissioner, and Richard H. Gould, P.E., Director of Sewage Disposal. Further details on the advantages obtained by applying dual-fuel engines for sewage treatment can be obtained by writing The National Supply Company, Engine Division, Springfield, O.

Superior ENGINES — ATLAS Imperial DIESEL ENGINES

DIESEL • DUAL FUEL • GAS

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# "Tycol Adelbus cuts costly overhauls... Diesels give years of top service with negligible liner wear"

Exactly! Tycol Adelbus Diesel Oils are fortified with selected additives that provide a tough "film of protection," and help to eliminate sludge and varnish. They have excellent detergent-dispersive characteristics and amazing resistance to heat... assure the piston seal that means FULL power and economy . . . and provide exceptional resistance to oxidation.

Complete information about Tycol Adelbus Diesel Oils is available from your nearest Tide Water Associated office. Call or wire now.

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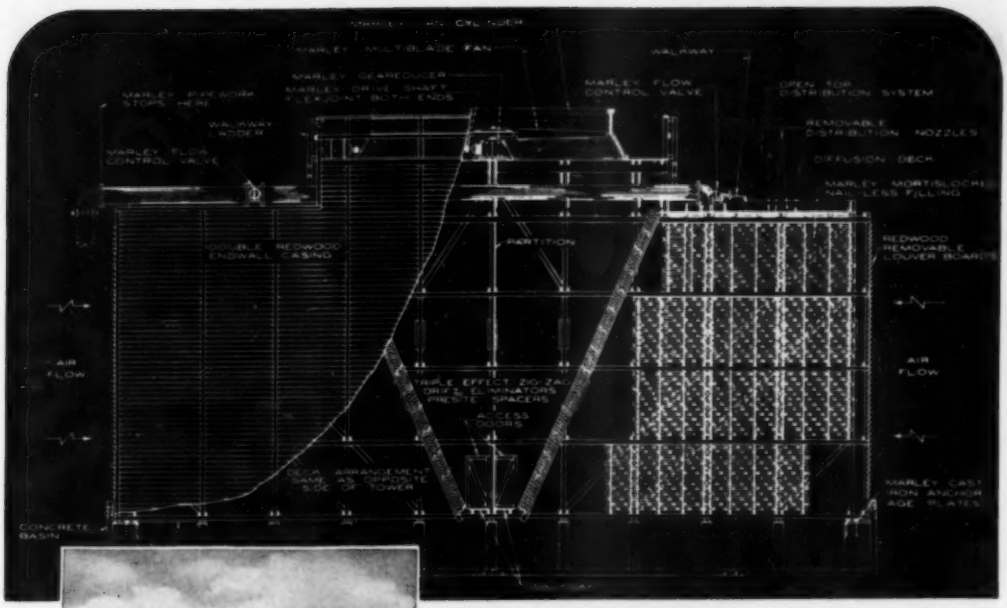


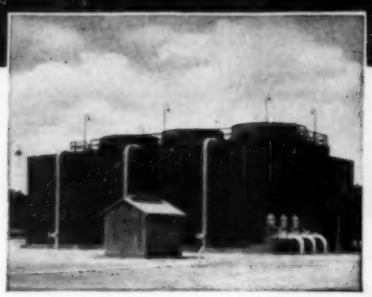

## for DESIGN and PERFORMANCE

# *Engineers who know, choose* MARLEY Double-Flow

Marley Double-Flows cool 13 billion gallons of water daily . . . more than any other type of tower. The reason why Double-Flows are the outstanding choice of engineers for industrial service is the combination of exclusive features only Double-Flow offers.

Such distinctive design features as open distribution, full height louver walls, MortisLocked filling, rugged structural strength and mechanical equipment engineered exclusively for cooling tower service are the advantages engineers demand and find only in Double-Flows.

These features mean high efficiency performance . . . unique flexibility of operation . . . complete accessibility of all parts of the tower . safety for operators . . . inspection and maintenance with least possible effort.

Repeat orders are the best criterion of performance for cooling towers, and in industry after industry multiple installations of Double-Flow cooling towers are the dominant rule. Many plants use from two to ten or more Double-Flows and in one industrial organization, 33 of these modern cooling towers are in daily service.

producers of

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DRICOOLERS
AQUATOWERS
NATURAL DRAFT TOWERS
CONVENTIONAL TOWERS
SPRAY NOZZLES
DOUBLE FLOW AQUATOWERS

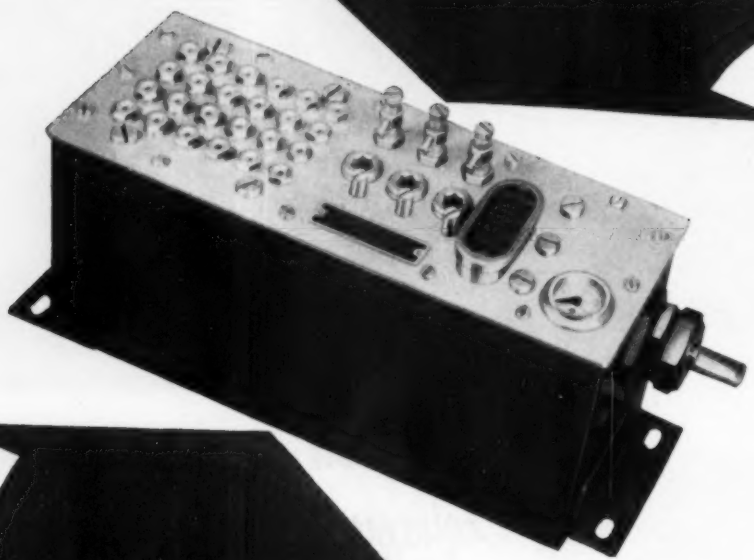
MARLEY

**The Marley Company, Inc.**

KANSAS CITY 5, MISSOURI

# MADISON-KIPP

## *Fresh Oil* LUBRICATORS



**THE MOST DEPENDABLE OILING SYSTEM EVER DEVELOPED!**

**MEASURED FEED DROP BY DROP FED UNDER PRESSURE!**

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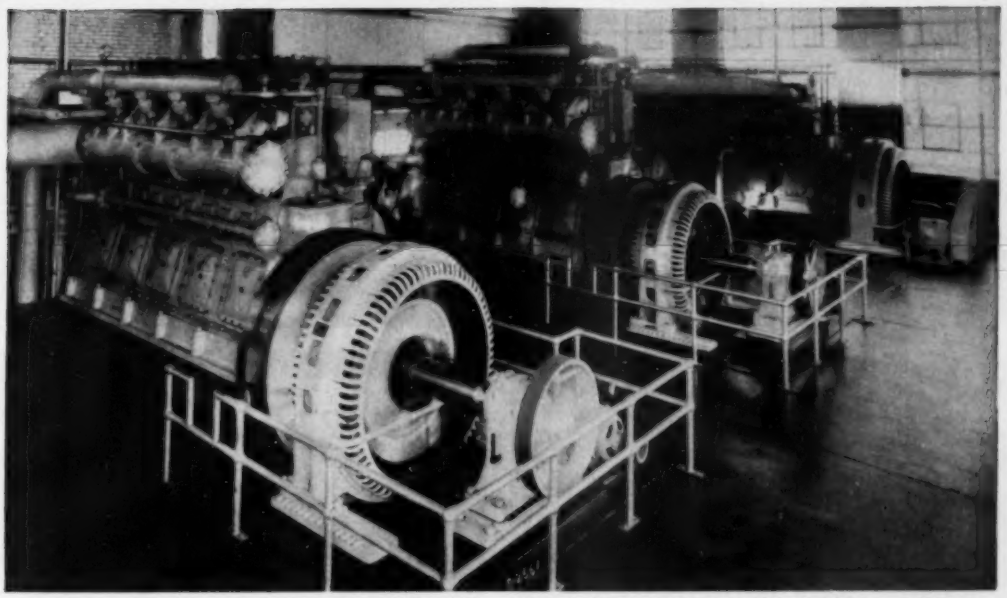


ENGINES IN FOREGROUND ARE ORIGINAL UNITS installed in 1939. Background engine is the latest supercharged unit installed in 1950. Another supercharged unit, placed in service in 1947, is not shown in this view. The output of this plant has increased from 952,600 kw hrs for the first year to 3,792,900 kw hrs for the year ending December 31, 1951.

# Power plant is financial asset for city of Odessa, Missouri

**PROFIT used to pave streets, pay off water and sewage bonds, operate water department, and to pay for power plant itself.**

Odessa, Missouri, is an agricultural trading center 38 miles east of Kansas City.

In 1939 the town took a big step—they started operation of a power plant that has since provided the small part-farm, part-suburban community with continuous, dependable, economical power. And equally important, it brought new income that did more than pay for power plant operation.

It also helped pave the streets, pay off water and sewage bonds, and is paying off the cost of the new plant itself.

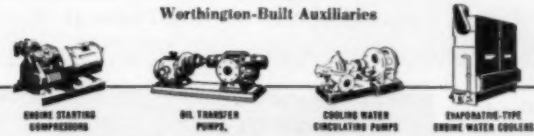
In spite of the high profitability of plant operation, rates have been lowered twice, and are today as low as can be found anywhere in the state.

Much of the credit for the success of the plant goes to the high operating efficiency of the four Worthington Diesels. After the two original units had been in service about eight years, the first supercharged engine was installed in 1947. An additional supercharged unit was placed in service in 1950. Present output of the plant is 13.5 kw hrs per gallon with a load factor of 69.5%. The two supercharged engines—at this same load factor—averaged 14.0 kw hrs per gallon.

If you are interested in learning more about how modern Diesels, dual fuel, or high compression gas engines can help you reduce your power bills, write to Worthington Corporation, formerly Worthington Pump and Machinery Corporation, Engine Division, Buffalo, New York.

E-2-3

Worthington-Built Auxiliaries




**Economical Continuous Power**—Diesel Engines, 150 to 2,640 hp . . . Gas Engines, 190 to 2,880 hp . . . Dual Fuel Engines, 150 to 2,640 hp.

**WORTHINGTON**
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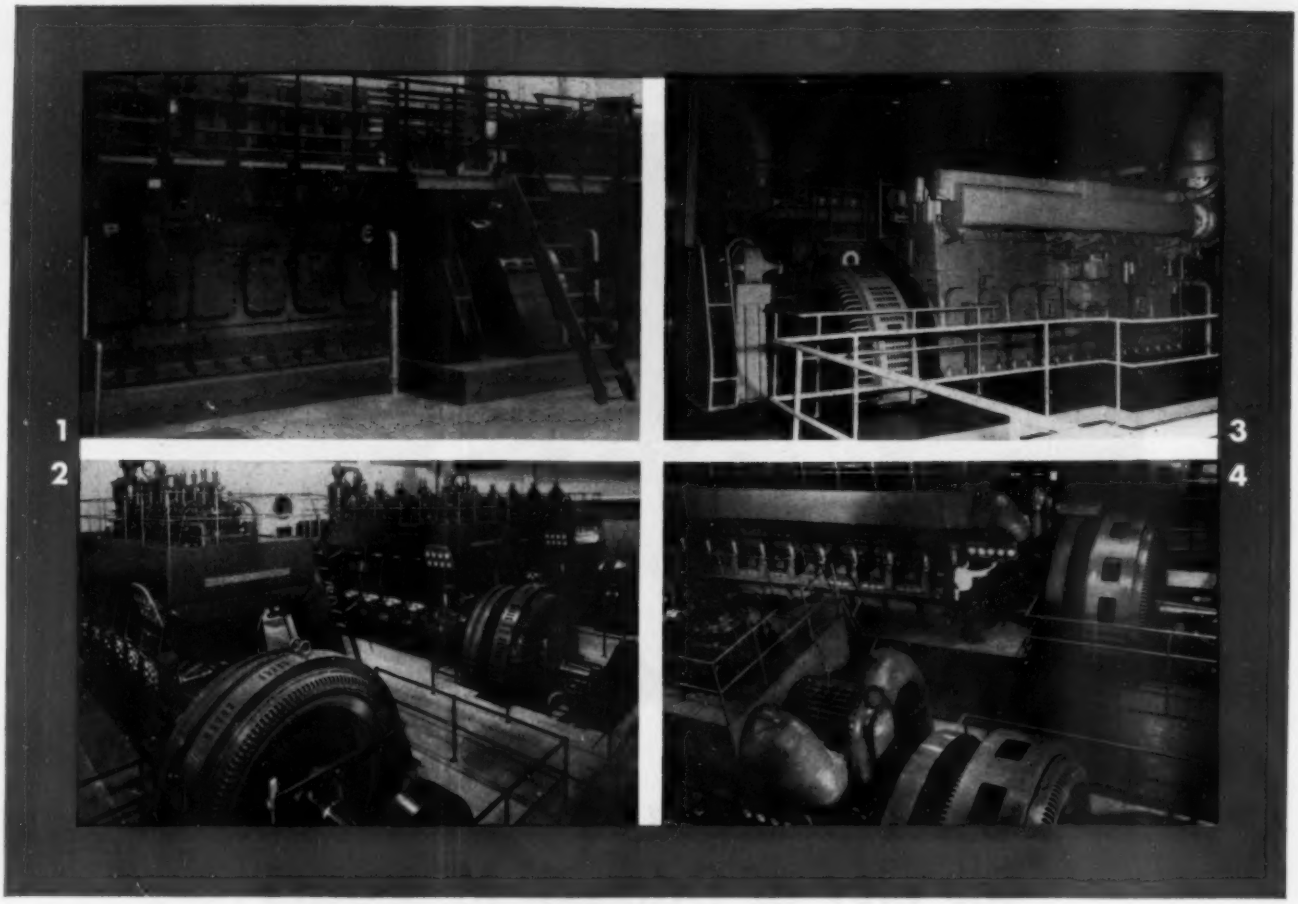


# Four more tough power problems solved with Westinghouse A-C Generators

**1** When Westinghouse was asked to sandwich an a-c generator in between two big twin diesels, an unusual application problem developed. One question was—how to insulate against the flow of shaft currents. Westinghouse engineers came up with a special coupling insulation that paved the way for future installations of this type.

**2** Starting 1,000-hp motors at a large western cement plant puts a heavy load on ordinary generators . . . causes considerable voltage drop. Power plant specifications called for a minimum voltage drop. Westinghouse engineers solved the problem with the special generators pictured above—typical of the problem-solving ability offered by Westinghouse.

**3** Cooper-Bessemer, called on to install a gas-diesel, engine-driven generator at the Yuma, Arizona plant of the Arizona Edison Company, selected the generator that could match the full-load, around-the-clock performance of the 16-cylinder, gas-diesel engine. They chose Westinghouse.

**4** At the Langley Aeronautical Laboratory of the National Advisory Committee for Aeronautics, the problem was to supply supplementary power at peak loads to operate the large wind tunnels, and stand-by power to serve the general research needs. Four Westinghouse 6,600-volt, 2,500-kw, a-c generators have been successfully meeting these demands for the past ten years.

What about your tough power problems? Call your Westinghouse representative and let him help you arrive at the best solution. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-10381

YOU CAN BE SURE . . . IF IT'S
Westinghouse
A-C GENERATORS

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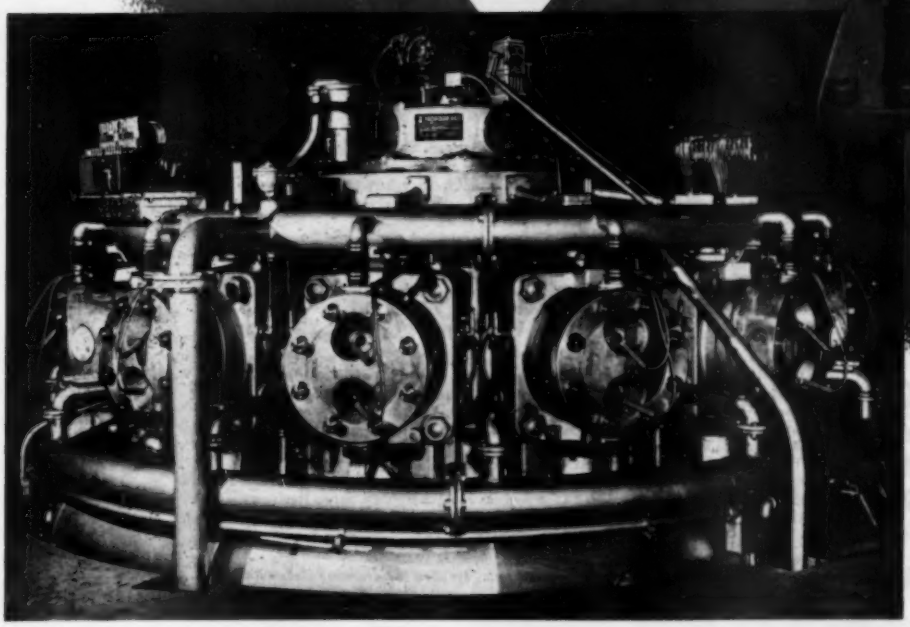
**Used on the 74 Recently Installed**

**Nordberg Gas-Burning**

**Radial Engines**



**...operating in the Alcoa Point Comfort reduction plant at Port Lavaca, Tex.**

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**. . . YET SCRAP INVENTORIES ARE ALARMINGLY LOW. *YOU* ARE BEING COUNTED ON TO HELP KEEP THE FURNACES WORKING . . . TO AID DEFENSE**

With our increased steel production, the furnaces are gobbling up an enormous amount of iron and steel scrap.

More—far more—scrap than is at present going into their scrap stockpiles.

Many mills are operating on a hand-to-mouth basis. Some are already threatened with shutdown—for lack of scrap.

**The Danger Is Increasing**

Will efforts to fill the tremendous demands for steel fail because of lack of scrap?

Steel is made from 50% scrap. We could be severely handicapped—in our aim to keep abreast of both military and civilian requirements—if scrap suppliers can't keep pace with productive capacity.

But they *can* keep pace . . . with your help!

**Enough Scrap IS Available!**

Yes—the only problem is to get the available extra scrap from where it is—to where it's needed.

Where is it?

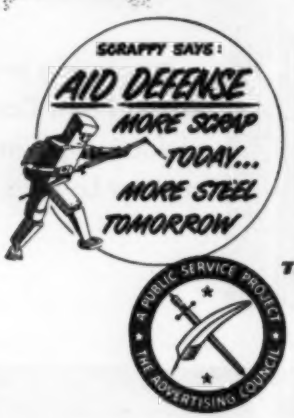
In *your* business . . . in the form of old machines and equipment, tools, implements, dies, jigs, fixtures, outmoded structures, chains, valves, wheels, pulleys—any old iron and steel that's rusting away.

**Six Million EXTRA Tons Needed!**

By the end of 1952, we'll be producing steel at an annual rate of 20 million tons more than in 1950. That means we will need at least 6 million more tons of scrap than we've ever needed before.

It's up to you. Write at once to Advertising Council, 25 W 45 St., New York 19, N. Y., for a free copy of "Top Management: Your Program For Emergency Scrap Recovery".

Please write today—there's not a day to lose.




**NON-FERROUS SCRAP IS NEEDED, TOO!**

***This advertisement is a contribution, in the national interest, by***

R. E. Thaddeus

Editor—DIESEL PROGRESS

# BUDA DIESELS INCREASE PROFITS

## *because* they cost LESS to operate

Buda dyna-swirl truck Diesels everywhere are *averaging* 160,000 to 200,000 miles before overhaul—with lower maintenance and parts costs—with less engine downtime for "nickle and dime" tinkering . . . . Buda Diesels increase the profit made on every unit they power.

*Your* answer to rising costs and tougher competition . . . is powerful, dependable heavy duty Buda Truck Diesels, built to deliver longer operation at lowest all-around costs.

**Your nearby Buda Engine Distributor can show you the way to more profitable operation. Ask him for details on Buda Truck Diesels today. Write for Bulletins and Specifications. The Buda Company, Harvey, Ill.**

**Check the records of BUDA Diesel fleet users —notice their economical operation costs**

**BUDA**

**A POWER-FULL AND DEPENDABLE NAME IN ENGINES**

BA-30

Manufacturers of Material Handling Equipment, Lifting Jacks, Maintenance of Way Products, Earth Drills and Diesel and Gasoline Engines

*Drawn above is a magnified view of two drops of Diesel lubricating oil taken from two new Diesel engines.*

# Which is the better diesel oil?

Chances are, you'd pick the clear clean oil on the right as the better oil . . . but you'd be wrong.

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Why not discuss your operation with a Cities Service Lubrication Engineer. His experience and the complete line of scientifically-formulated Diesel lubricants can mean improved operating conditions for you. Write to CITIES SERVICE OIL COMPANY, Dept. F 15, Sixty Wall Tower, New York City 5 . . . or call the Cities Service Office nearest you.

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**QUALITY PETROLEUM PRODUCTS**

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**FRONT COVER ILLUSTRATION**

Around a curve at one of Colorado's wide mountain highways, a Kenworth truck, powered by a 335 hp. Model NHRS-6Se Cummins diesel, owned and operated by Kingsley Truck Lines, Inc., Denver, speeds its way west-ward.


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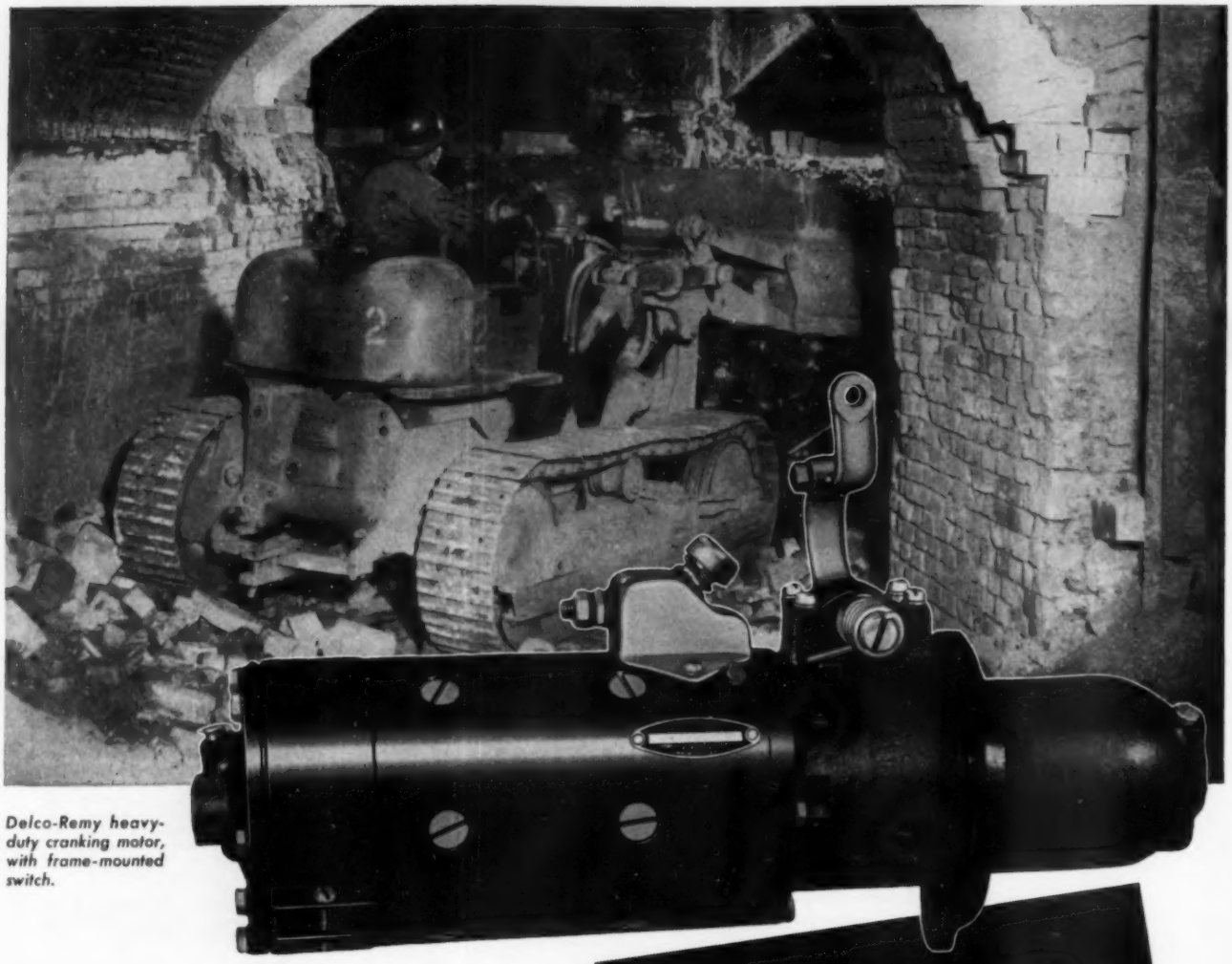

*Delco-Remy heavy-duty cranking motor, with frame-mounted switch.*

# SERVING THE DIESELS
## THAT SERVE AMERICA

A Diesel tractor noses its way into an open hearth furnace, removes the slag and burned-out bricks . . . while they're still hot!

This is just one example of the many vital ways that Diesel engines are serving America today.

And serving many of these brawny Diesels is electrical equipment which bears the name Delco-Remy.

For Delco-Remy has long been a symbol of highest quality . . . dependable performance.

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A GENERAL MOTORS PRODUCT — A UNITED MOTORS LINE
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**DELCO-REMY • WHEREVER WHEELS TURN OR PROPELLERS SPIN**

# ALCOA ADDS SEVENTY-FOUR ENGINES

## Point Comfort Aluminum Reduction Plant Now Contains One Hundred and Ninety Four Nordberg Radial Engines

*By* REX W. WADMAN

PORT LAVACA, Texas, April 21.—Some two years ago, on May 27, 1950, to be exact, I was down here at Port Lavaca to cover the initial story on the Aluminum Company of America's huge aluminum smelter built at Point Comfort, Texas, across the bay from this town. In that article, which appeared in the July, 1950, issue of DIESEL PROGRESS, I told you about the three power buildings, each equipped with 40 Nordberg 11-cylinder radial engines with a bore of 14 inches and a stroke of 16 inches. I told you that the total capacity of these three power buildings was approximately 120,000 kilowatts. My job here today is to tell you about the addition of two new power buildings to the Point Comfort Alcoa works, which raises the total horsepower here to approximately 350,000 hp., making it unqualifiedly the largest internal combustion engine installation in the world.

This Point Comfort, Texas, plant of the Aluminum Company of America for the reduction of aluminum is located some 135 miles south of Houston on a tract of 3,000 acres on Matagorda Bay. With the addition of the new engines, which I am going to tell you about a little later, the smelting capacity has been increased by about 70% since the start of operations back in January of 1950. As you may remember, the original power houses here contained 40 Nordberg radials, each with eleven cylinders, and in three buildings. Now two additional power buildings have been added, and there are 37 of the new radial Nordbergs in each of the new buildings. Seventy-four additional engine-generator units totalling approximately 150,000 horsepower convert the natural gas of the Point Comfort area into 100,000 kilowatts of additional electrical energy on a 24 hour a day, seven day a week schedule. This power added to that generated by the original 120 gas-burning radial engines gives this plant a total of approximately 350,000 hp.

The Nordberg engines are of the two-cycle, gas-burning radial type incorporating an advanced design of Bosch dual spark ignition. They each have 12 cylinders of 14-in. bore and 16-in. stroke, and are operated at 360 to 400 rpm., each developing 1925 to 2125 horsepower. The Buffalo Forge scavenging air blower is motor driven as are the lubricating oil and jacket water pumps. Alternating current for these auxiliaries and the radiator and generator ventilating fans is taken directly from the generator.

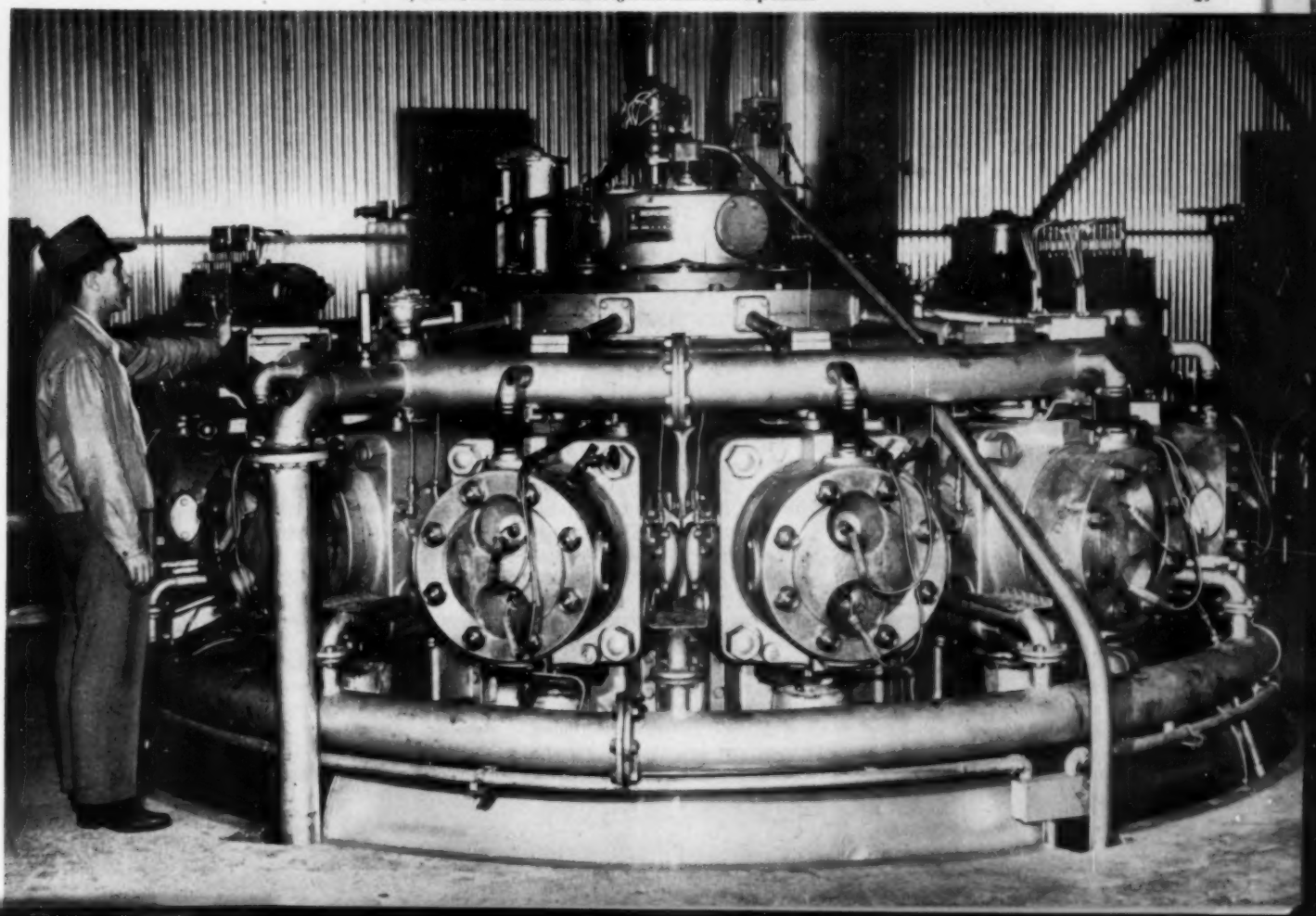
Each engine is arranged with port scavenging and port exhaust and the intake and exhaust is timed by the pistons as they uncover the ports in the cylinder walls. Intake and exhaust valves are thereby eliminated. The circular exhaust manifold is located directly beneath the grating at engine room level. The cover of the engine bolted to the top of the frame has a symmetrical design and contains the upper crankshaft bearing.

Mounted on top of this cover is the Marquette hydraulic relay governor and operating mechanism for the gas valves.

Natural gas is admitted by cage mounted gas

**Close-up of one of the new Nordberg 12-cylinder radials at Point Comfort, Texas, with Howard Keefer, Power Plant Superintendent, at the left. Marquette governor is at top right, Manzel motor driven lubricators left and right, Bacharach indicator valves on all cylinders, and American Bosch ignition distributor top center.**





Section of one of the new power houses at the Aluminum Company of America Point Comfort, Texas aluminum reduction plant, showing eight of the new 12-cylinder Nordberg radials on the line. There are 37 of these engines in each of the two new buildings. Note the Hilco activated alumina packed lube oil filter along side wall, and adjoining Hilliard Full-Flow blotter type filter for each engine.

valves. The valves are operated by a cam on the crankshaft and are so located that gas is admitted into the path of the incoming scavenging air. This assures thorough mixing and efficient, economical burning of fuel. A valve inserted in the gas line and controlled by the hydraulic governor varies the amount of gas delivered to the cylinders according to the load on the engine. While the new engine embodies the fundamental design of the original 11-cylinder engines, there are two major differences. One of these is that the engine is increased nine per cent in rating by making it a 12-cylinder unit, each cylinder being the same size as was used in the original 11-cylinder engines. The other, quite important, change is that the scheme used to provide stability of the master crankpin bearing assembly is radically different than that employed with the 11-cylinder engine. Those of you who are familiar with the 11-cylinder engine recall that this crankpin bearing assembly was caused to gyrate and restrained from rotating by means of an ingenious use of planetary gears. In the new engine, this method is replaced by an assembly involving two connecting rods and their knuckle pins, which are tied together by means of restraining cranks and a tension link. The relatively small residual torque tending to rotate the master crankpin bearing assembly is absorbed through two master connecting rods and pistons.

The simple, compact design of this radial engine reduces floor space to about one-half the usual requirements and allows the engine to be shipped completely assembled from Nordberg's Milwaukee plant to the installation site. This materially reduces the cost of installation work since the engine has all piping in place, except the exhaust and scavenging headers.

Few if any changes have been made in the general plan of installation or operation, but I will give you now the few additions or changes which have been made. For instance, the original plant contained 40 General Electric generators, 40 Westinghouse generators, and 40 Elliott generators.

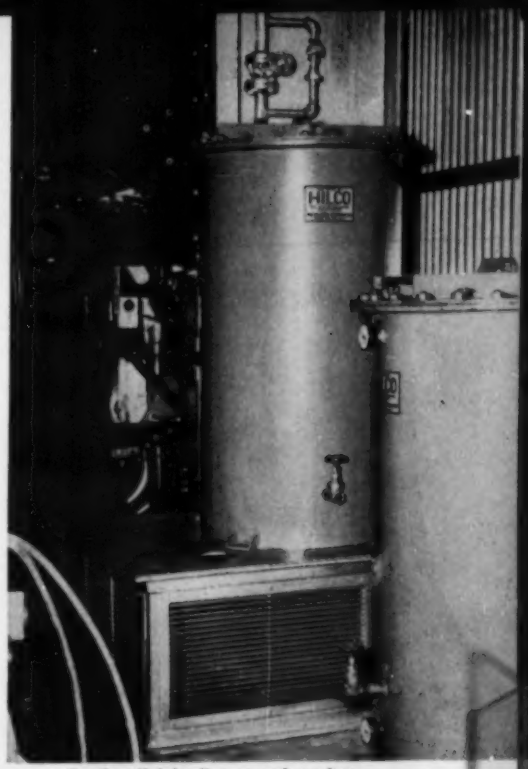
The two new power buildings contain 74 Elliott generators. The same general plan is followed here. Each engine generator produces both dc. current and ac. current as will be seen by the illustration in this section. This method of producing both the dc. and the ac. current with the one generator eliminates the need for a common auxiliary power system, and the possibility of a total station interruption. It might be added that for starting the generator is motorized.

As in the original three engine rooms I described to you in July of 1950, each engine-generator unit has its own control panel, which includes engine protective equipment. A few changes have been made here for the better, and I will try to give you a detailed description of this panel and what it accomplishes. If you will refer to the illustration of the control board in this section, you will find on the left hand side the indicating instruments for generator output, consisting of a dc. voltmeter; dc. ammeter; frequency meter indicating engine speed; throttle control—which is remote control for starting engine; generator circuit breaker controls; generator shunt field rheostat control.

On the right hand side of the control board, which is the protective end, the indicating motor driven pyrometer is at the top and indicates the exhaust temperature of each of the twelve cylinders, is equipped with a thermo-couple transfer switch, motor driven. This Alnor pyrometer has an adjustable preset point which, when reached by any cylinder, automatically sets up a series of relays to shut down the engine. On this same board you will find the oil temperature indicating gauge; oil pressure indicating gauge; and a circulating water pressure and temperature gauge. Then comes the injection gas pressure on the engine gauge, and a series of protective relays and associated annunciator lights, and in the center of the board on this right hand side is the manometer which indicates scavenging air pressure, and from which scavenging air control is obtained. The actual operation of this board is as follows: The engine trip relay which shuts off gas, removes ignition, trips generator breaker, also extinguishes a big white light at the top of the cubicle which calls the down engine to the operator's attention. This relay is energized by (1) engine overspeed; (2) high exhaust temperatures; (3) low oil pressure, (4) high oil temperature; (5) high water temperature (6) excessive generator temperature; (7) thrust bearing failure; (8) loss of auxiliary ac. voltage. The main change here from the older control board is that the sensitrol unit is now incorporated in the Alnor motor driven pyrometer and direct operation of shut down relays is handled by this unit.

Lube oil filtration in these two new power buildings is handled pretty much as in the three older buildings, namely with a Hilliard by-pass type filter using activated alumina as its filtering media on each engine, but to this has been added a Hilliard Full-Flow oil filter so that the oil in each engine is passed through the Hilliard Full-Flow continuously and on into the activated alumina type unit on a by-pass system. Periodically the alumina is taken out of this big Hilliard unit to a processing building where it is reconditioned for further use by burning up the contaminants which it has accumulated in use. In this manner a large percentage of the alumina is returned and reclaimed for further service. At regular intervals the lube oil is taken out of each engine and returned to the lube oil processing building in which are located two DeLaval lube oil reclaimers, which of course operate on a batch system.

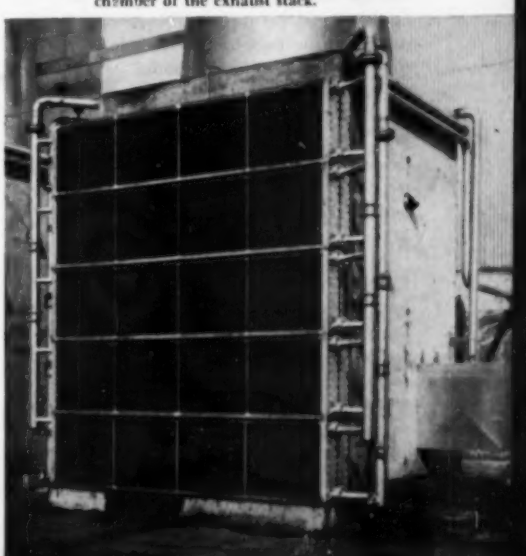
The Trane Company supplied the combination oil and water engine coolers for the two new buildings as they did for the three original power buildings. The only change here is that they are larger, to take care of the larger engines. An-

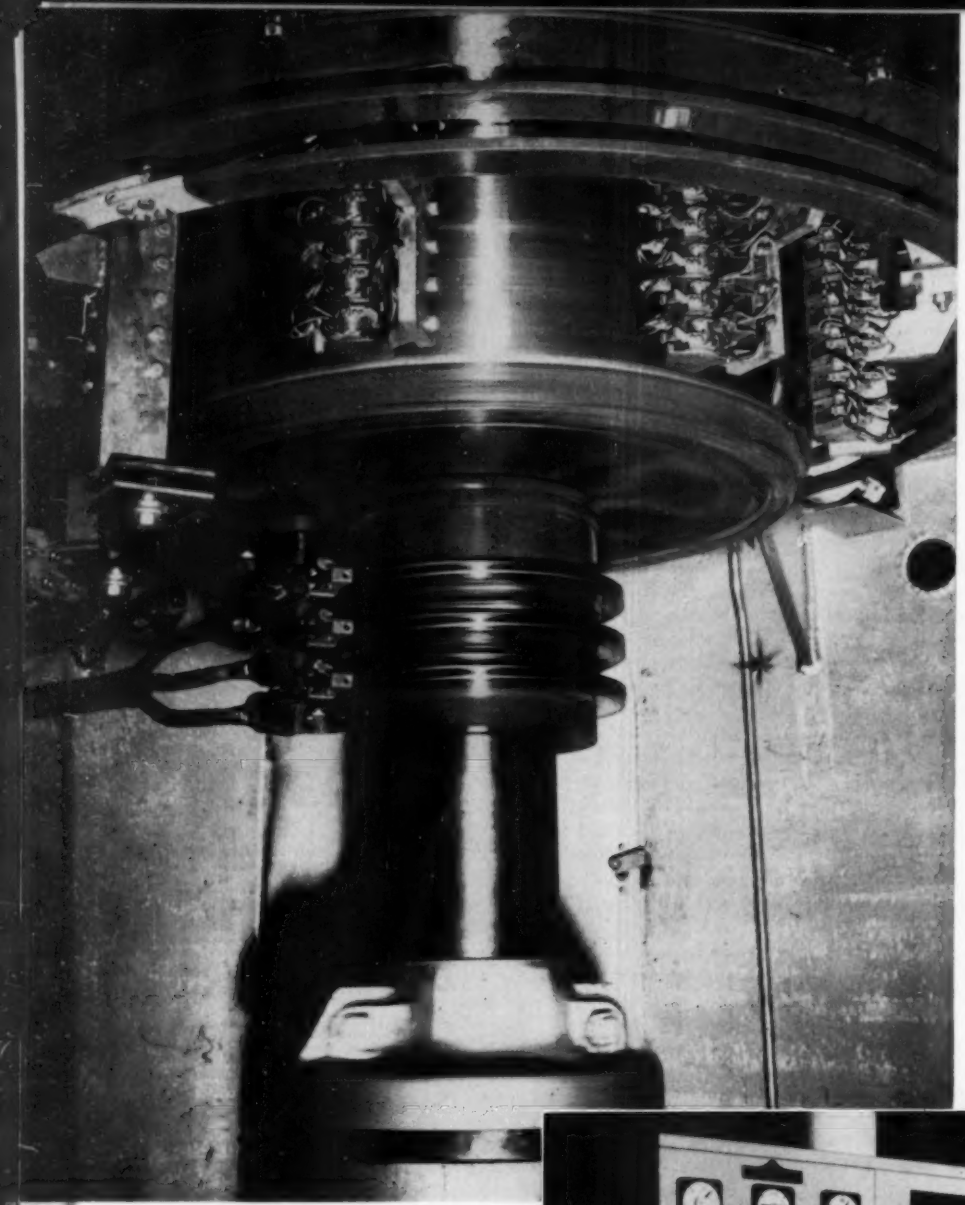



**On the oil inlet line to each engine there is a Hilliard Full-Flow blotter type filter through which all the engine oil passes before entering the engine. Adjoining is the Hilco by-pass type filter, packed with activated alumina as a filter medium.**

other row of four units is superimposed on top of the original twenty units. They are all-aluminum construction, except for the iron headers. The tubes are arranged in banks of three with the water tubes in front of the lube oil tubes. The tubes and vertical fins are joined mechanically; each exchanger consists, as I said, of five sections now instead of four, which are independent of one another except for a connection to a common manifold. Individual tubes may be cleaned, or cut out of the system, without interfering with the operation of the rest of the exchanger. A slight difference in construction is noticeable here. In the three original buildings

**The new Trane heat exchangers for the 74 new Nordberg radials, with an extra row at the top, over the units supplied for the three original power houses. Note that heat exchangers are now attached directly to the plenum chamber of the exhaust stack.**





Close-up of one of the 74 Elliott generators in the two new power buildings, generating 1200 kw. of direct current (at top), and 150 kw. of alternating current (at bottom).

there was a section between the heat exchanger and the stack base in which was located a vertical fan. In the two new buildings the heat exchangers are right against the side of the stack base, and in the plenum chamber is now located an axial flow fan which is connected by means of a 36-inch underground tube to the base of each generator, thereby pulling the air from the basement through the generator and discharging it up the stack, as against the fan being located under each generator as in the original layout of the first three power buildings.

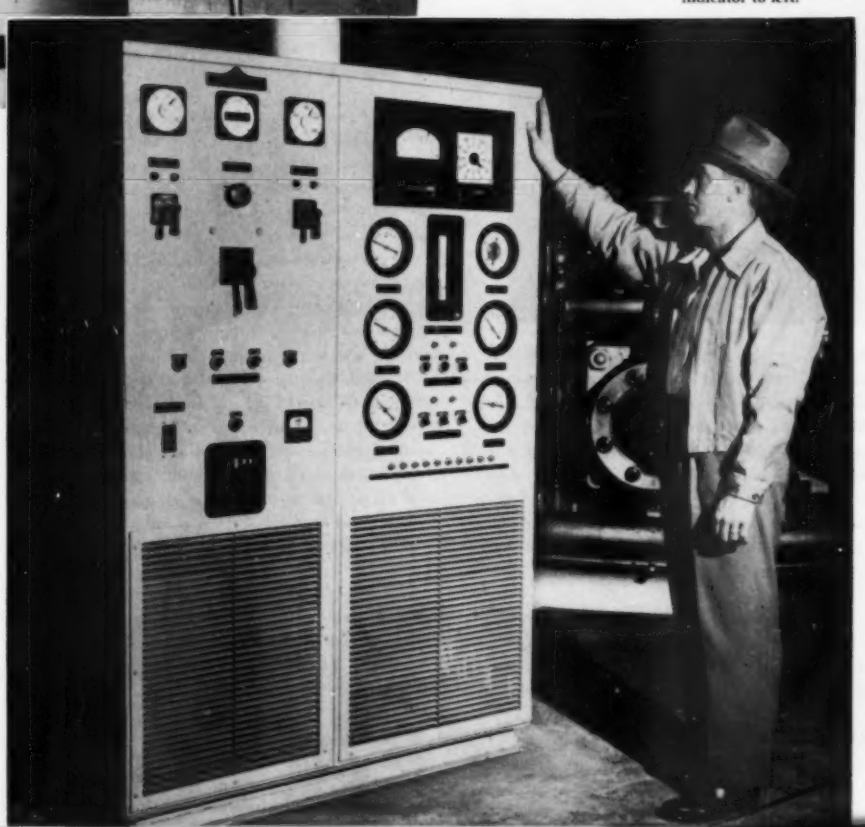
Circulation of the air is the same in the new building as the old—it is kept moving through the engine room, down through the generators and up the stack so that there is a constant flow of fresh air through the Continental building air washers where it is washed and humidified, then discharged in the basement of the building. The filtered air entering the basement is taken into the engines through American air filters where it gets a second protection—paper cellulose filters—for the combustion air of each engine. Because of the more or less constant alumina powder content in the air surrounding an aluminum smelter or reduction plant, it is necessary to maintain a slight air pressure within each power building as is done here to keep out unfiltered, untreated air.

The gas regulators here in these two buildings, as in the original three, are Emco, made by Rockwell, and there is one for each engine. Rockwell also make the gas meters for the entire plant.

As in the three older buildings there is a 60-unit Goulds storage battery located in each engine room to furnish energy for control of generator breakers, engine protective equipment, as well as for emergency lighting.

In the engines themselves, which I have described earlier in the article, there is one noticeable change, and that is in the governors. These 74 engines are equipped with Marquette hydraulic governors. Each cylinder of these 74 engines is equipped with a Bacharach valve and Bacharach Model CP-2 indicator for taking permanent indicator card records of each cylinder. This Bacharach indicator valve is attached to all of the cylinders in the three older power houses here, and this procedure of reading peak pressures, etc., is characteristic of the maintenance schedule.

The lubricating oil used here is still Gulf Parvis "H," as was the case with the original 120 engines. The intake air washers for the new engines are Continental Air, and the intake air filters for

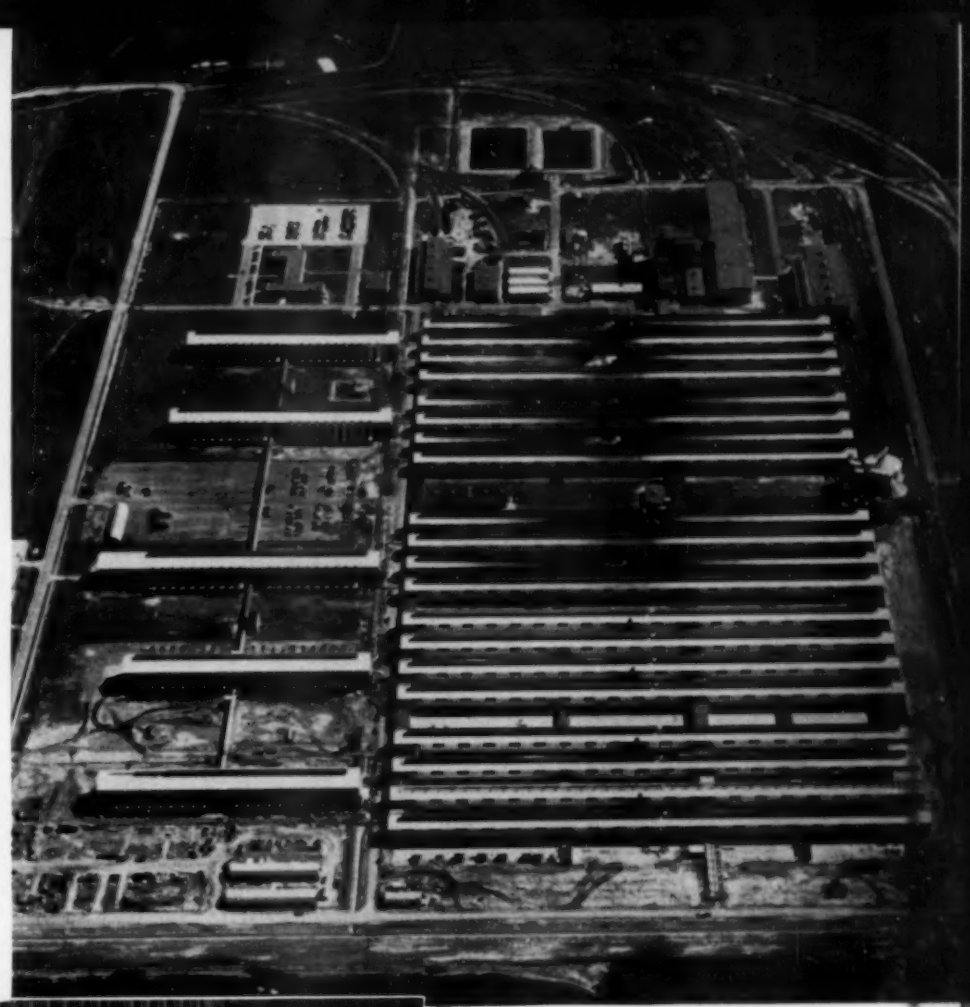


One of the new control cubicles with Howard Keefer at the board. Note Alnor motor driven pyrometer with indicator to left.

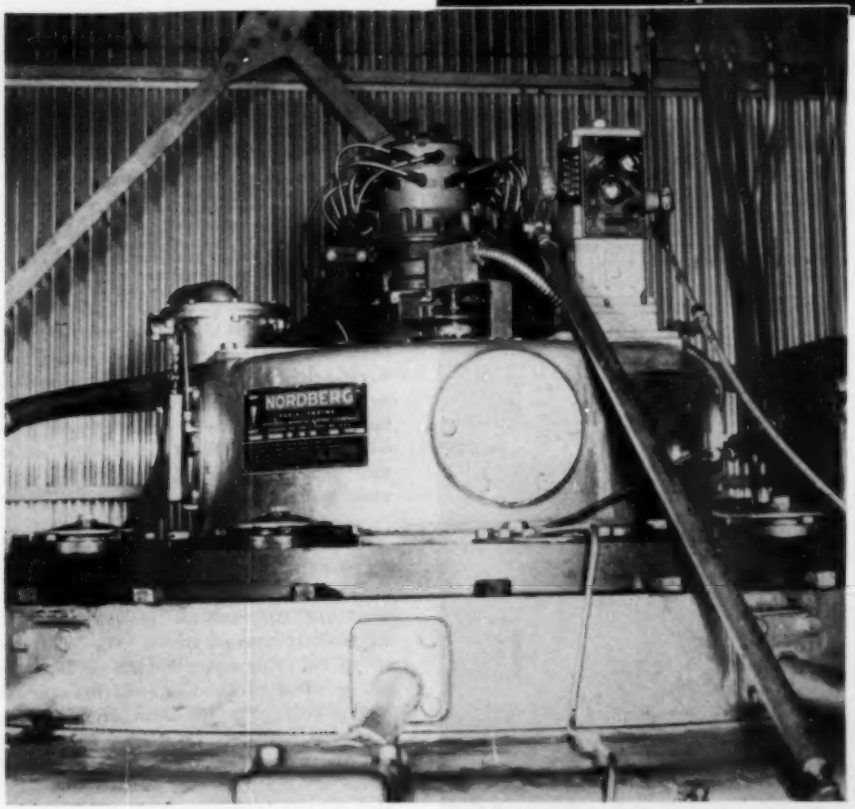
each engine are American Air. Lube oil pumps are DeLaval, the scavenging blowers are Buffalo Forge, the tachometers are James G. Biddle, the manometers are Meriam, and the two mechanical lubricators on each engine are Manzel here just as they were in the three power houses I talked about in July of 1950. The ignition equipment originally supplied by American Bosch Corporation for the first 120 engines, was also supplied by them for the 74 new engines.

These five huge power buildings housing some 350,000 hp. of natural gas engines are in charge of, and under the capable supervision of Mr. Howard Keefer, who has been in charge of this operation from its very inception in January, 1950, and was also test engineer for the pilot unit which was operated from 1946-1950 at Alcoa's East St. Louis plant. Each building is operated by a three-man shift, consisting of a foreman and two assistants for each of the eight-hour watches, which is reducing personnel almost to the irreducible minimum.

The Aluminum Company of America set a new pattern for the design, building and location of modern aluminum reduction plants, selecting this Gulf Coast area for one of the largest smelters of its type in the world. This pattern of Alcoa has been closely followed by the Kaiser Aluminum and Chemical Corporation at their Chalmette, Louisiana, reduction plant which I described in



**Top hamper of the 74 new Nordberg radials at Point Comfort, Texas, showing the Marquette governor to right, and American Bosch ignition distributor center.**




**Air view of the Point Comfort, Texas aluminum reduction plant of the Aluminum Company of America, with three original power houses left foreground, with the front one not yet completed.**

the February, 1952, issue. And again the pattern has been closely adhered to by the Reynolds Metals Company at Corpus Christi, Texas, whose new reduction plant will be described in considerable detail by me in the July issue of DIESEL PROGRESS. It may well be that history will prove these three modern, well-designed smelters, using natural gas and natural gas engines as their source of power, to be the most efficient and economical reduction plants in the whole United States. The tremendous volume of natural gas available in this area makes the cost of gas delivered to these three plants very, very low and these is a guarantee of unlimited future gas production, so unlimited that it is possible to obtain from reputable gas production companies here on the Gulf Coast contracts running for thirty years or more.

It has been a matter of great encouragement to me to see the faith that the Aluminum Company of America has in the use of natural gas engines for the production of aluminum by the addition of these 74 Nordberg radial engines to the plant they already had here containing 120 Nordberg radials. Such faith, backed up by the millions of dollars which it has taken to build this smelter here, is convincing evidence of the economy of natural gas engines and of the surety of the supply of natural gas far into the foreseeable future.

# FIRE PROTECTION FOR IDLEWILD

*By* WILBUR W. YOUNG

NEW YORK'S International airport at Idlewild, Long Island, is provided with a fire-fighting system capable of throwing 34,000 gallons of water per minute—enough to fight two simultaneous fires in separate hangars. That is, all-out fires requiring the deluge system to be wide open. They hope it will never be used—but there it is, ready for immediate action—a tribute to the foresight and engineering skill of the self-sufficient Port of New York Authority.

The fire pumping station at Idlewild is a separate building, overlooking the ten miles of runways, the widely scattered hangars and administration buildings and closely tied in with the intricate communication systems. It is a modern steel, concrete and brick structure divided in two parts, one housing the pumping equipment, the other part containing four emergency water storage tanks with a total capacity of one million gallons.

Normal city water supply enters the building through 36-in. and 30-in. mains at the East and West ends, so looped and valved to permit various combinations of pumping units to be used, or to divide the equipment into two separate pumping systems. Supply lines from the emergency storage tanks are tied in with check valves to prevent the city pressure from backing up in the reservoirs.

Selection and arrangement of the pumping machinery reflects forward planning for every contingency. There are two separate sets of pumping units, each having a capacity of 17,000 gallons per minute. Each consists of a battery of five pumps of identical capacities, but one group of pumps is direct motor-driven, the other being diesel-driven through speed increaser gears. There is also a motor-driven make-up pump of 100 gallons per minute capacity that maintains 165 psi. pressure on the entire system (ten mills of riveted steel pipe) at all times.

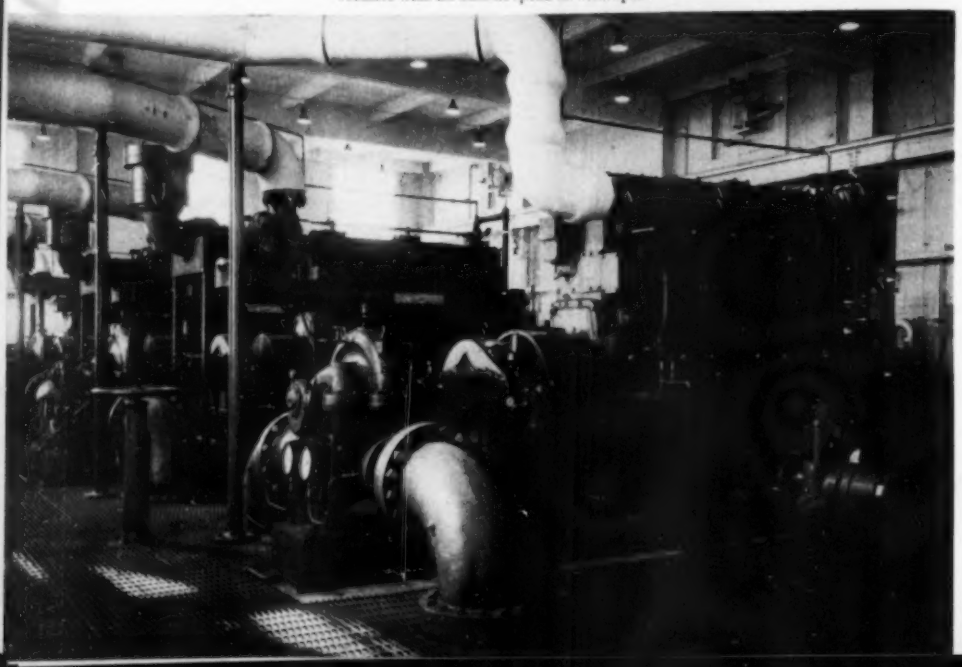
All of the pumps are DeLaval centrifugal type and each group consists of two 2500 gpm. and three 4000 gpm. units. Motors are all Crocker-Wheeler, two of which are 210 hp. units, the other three being rated 350 hp., all at 1765 rpm. The make-up pump is driven by a Crocker-Wheeler, 20 hp., 1760 rpm. motor.

Five Superior diesels provide power for the other battery of pumps. They are 8½ in. x 10½ in. engines, running at 720 rpm., two of them being naturally aspirated and rated at 260 bhp., and three being Elliott-Buchi turbocharged and rated at 390 bhp. The 260 hp. engines drive the two 2500 gpm. pumps and the 390 hp. engines drive the 4000 gpm. pumps. Link-Belt herringbone gears of 2.471:1 ratio increase the output speed to the pumps from 720 rpm. to 1775 rpm.

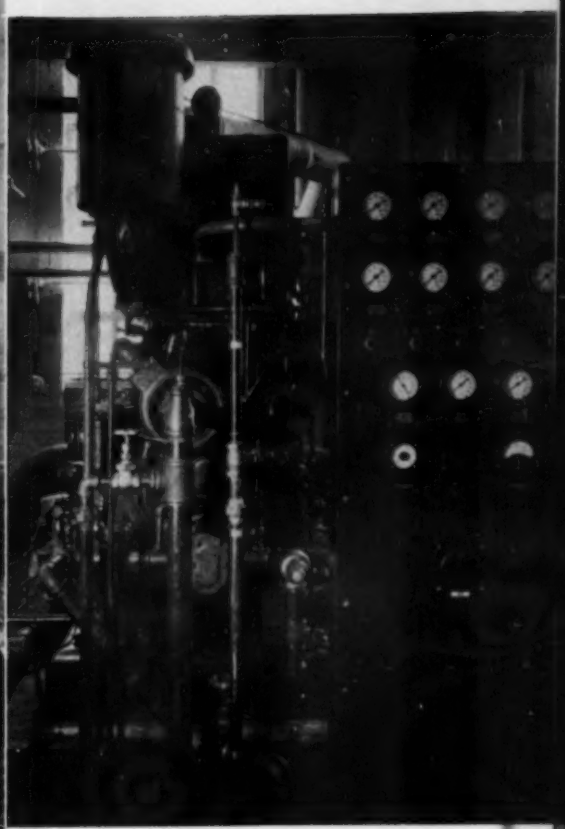
These engines are fitted with every protective device and operating necessity that would be found in a plant designed for continuous duty. Both full-flow and by-pass filtration is provided in the lube oil system of each engine and a duplex fuel filter protects the injection systems. Each engine control panel carries a pyrometer and tachometer and a full complement of pressure gauges. Dial thermometers show inlet and outlet temperatures on the lube and jacket water coolers and column thermometers are fitted in each cylinder jacket water outlet. The closed jacket water systems have heat exchangers using raw cooling water which is discharged to the storage reservoirs.

**General view of the Idlewild International Airport Fire Pumping Station, showing five motor-driven and five diesel-driven pumps. Total pumping capacity is 34,000 gpm. All pumps are DeLaval centrifugal type; motors are Crocker-Wheeler; engines are Superior.**

**Three of the Superior diesels are Elliott-Buchi turbocharged, the other two are naturally aspirated. All five engines are rated at 720 rpm. and drive through Link-Belt speed increasers with an output speed of 1780 rpm.**



Since the main diesels are used solely for pumping, there is a generating unit which stands by for emergencies. This is a Cummins, 150 hp. diesel and E-M, 100 kw. generator having a Synchro-Start automatic control. The main breakers on the utility supply line are set for under voltage release in timed sequence and over current protection. In the event of interruption of normal service, the generating unit is automatically started and it continues to run until service is restored, in fact, the control is set to keep the unit in operation for ten minutes after



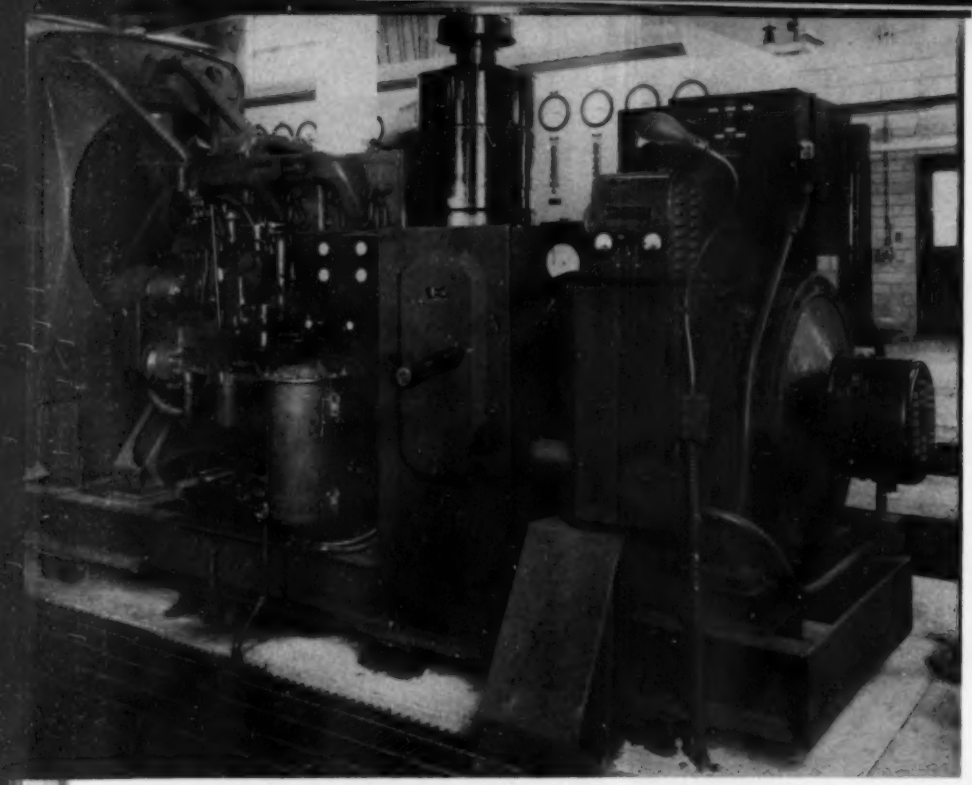
Close-up of engine control panel carrying Ashcroft gauges, Weston tachometer and Alnor pyrometer. All intake air cleaners are Air-Marc.

Each engine is equipped with Purolator full-flow lube filter, left end, and Nugent by-pass lube filter, extending through grating; Purolator duplex fuel filter, right end; Fulton-Sylphon control valve on raw water circuit, lower center.

restoration of service and to stop it automatically if everything is then in order. This unit, when operating, carries the emergency lighting of the pumping plant, the alarm and control board, the make-up pump, air compressors, fuel transfer pump, motor operated valves and raw water pump. Thus, the fire pumping station can operate independently of outside services under all foreseeable contingencies.

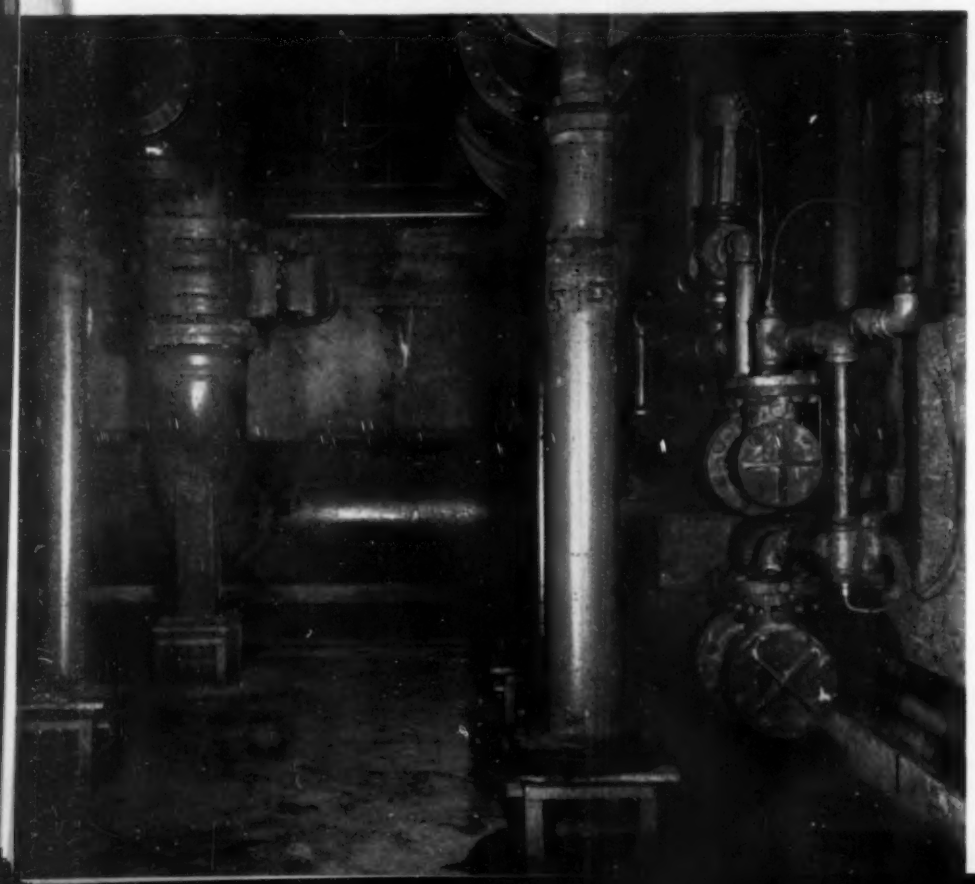
Each pumping unit may be valved on or off the line and all of these individual valves as well as the main supply valves are power operated by Limitorque valve operators. If the city water supply drops to 15 psi., the main valves automatically close and water is drawn from the emergency reservoirs. These main valves remain closed until the city pressure is restored to 35 psi.

The plant was designed by Walter Kidde Constructors and is owned and operated by the Port



Cummins diesel and E-M 100 kw. generator with Synchro-Start automatic control. Unit takes over plant electric load in event of utility line failure. Foundation isolation units are Korfund; intake filter, Donaldson; lube filter, Luberfiner.

Ross Lube and jacket water, coolers, lower right; Fulton-Sylphon control valve on lube circuit, upper right; Korfund spring bases for isolation of intake and discharge pipes, on the floor. This equipment is duplicated for all five engines.



of New York Authority. The building was erected by Green Construction Company, New York. Turbine Equipment Company, New York, installed the machinery. Jacobs Engineering Company installed all piping, plumbing, heating, alarm and control systems, and all other electrical work was done by McNutt Electric Company, New York.

A wonderfully integrated and coordinated plant is this—sensitive to any fire, large or small, that may threaten the remotest corner of the throbbing gateway of air commerce that is Idlewild. This delicately balanced mechanism may never be tipped into action—indeed it may never be.

## List of Equipment

Pumping Engines—Two Superior diesels, 8½x10½, 260 bhp. at 720 rpm. Three Superior diesels, 8½x10½, Elliott-Buchi turbocharged, 390 bhp. at 720 rpm.

Pumping Motors—Two Crocker-Wheeler 210 hp. at 1765 rpm. Three Crocker-Wheeler 350 hp. at 1765 rpm. One Crocker-Wheeler 20 hp. at 1760 rpm.

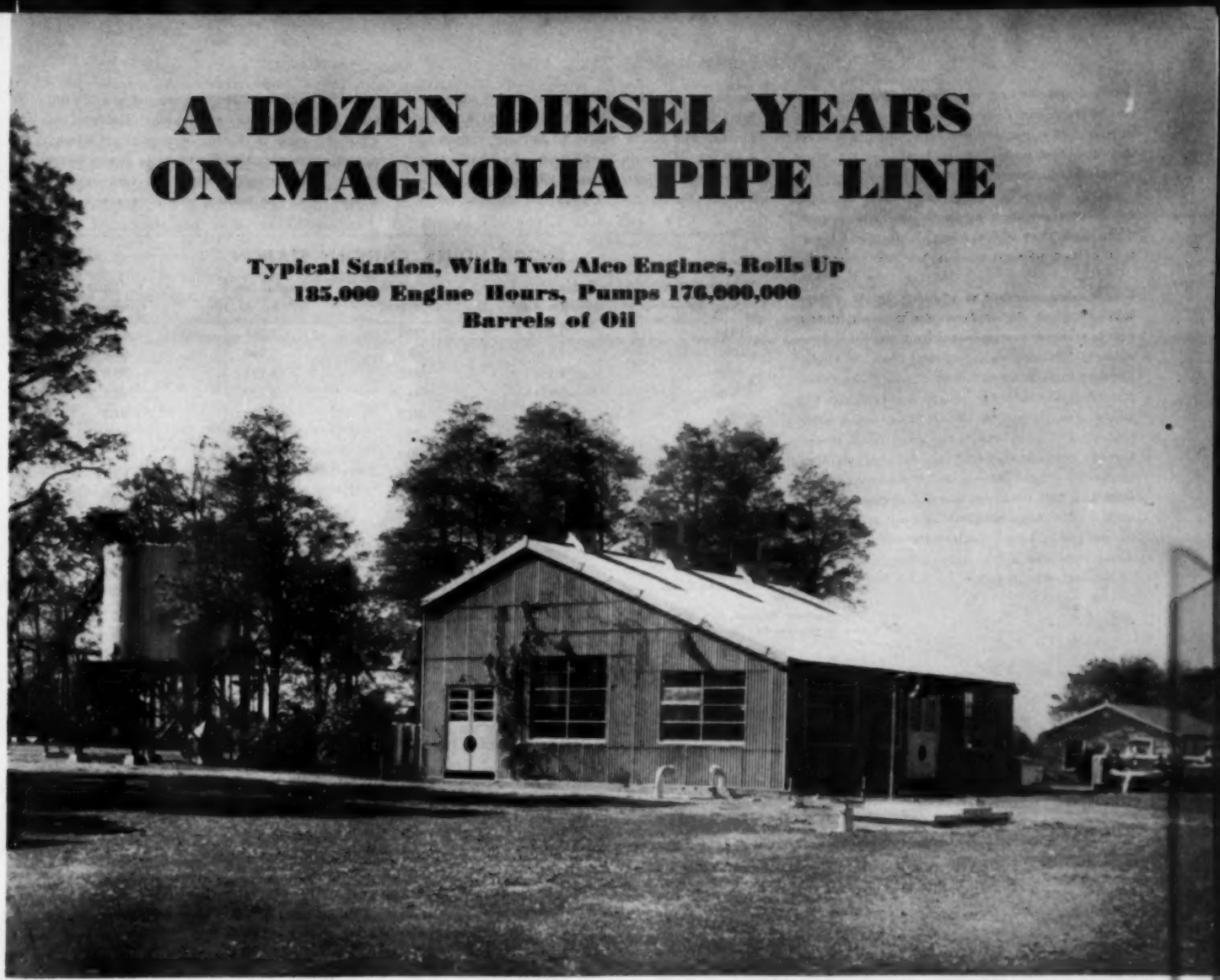
Pumps—Four DeLaval Centrifugal, 2500 gpm. Six DeLaval Centrifugal 4,000 gpm. One DeLaval Centrifugal 100 gpm. (Make-up.)

Engine Accessories—Lube Filters: 1 Purolator Full-Flow and 1 Nugent by-pass, each engine.
Fuel Filters—1 Purolator duplex, each engine.
Fuel Injection Equipment—Injection Nozzles on all engines. American Bosch.
Injection Pumps on two naturally aspirated engines. American Bosch.
Injection Pumps on three turbocharged engines. Scintilla.
Jacket Water Thermometers—U. S. Gauge, 8 each engine.
Lube Thermometers—Ashcroft dial type, 2 each engine.
Cooling Water and Lube Thermostatic Control Valves—Fulton-Sylphon, 2 each engine.
Intake Air Filters—Air Maze.
Governor—Woodward.
Over Speed Control—Pierce.
Water and Lube Coolers—Ross.
Tachometers—Weston, 1 each engine and duplicate on main control board.
Pyrometers—Alnor.
Pressure Gauges—Ashcroft.
Starting Air Compressors—Two Ingersoll-Rand, 250 psi., Diehl motor driven.
Day Tank Level Gauges—Rochester, dial type.
Manifolds—Helixhaust, Dayton Fabricated Steel Co.

Standby Generating Unit—
Engine—Cummins diesel, Model NHIS, 150 hp.
Generator—Electric Machinery Co., 100 kw.
Lube Filter—Luberfiner.
Air Filter—Donaldson.
Fuel Filter—Commercial.
Starting Battery—Exide.
Governor—Woodward.
Automatic Control—Synchro-Start.
Supercharger—Schwitzer-Cummins.
Starting System—Leece-Neville.
Isolation—Korfund Spring type.
Isolation of Supply and Discharge Pipes (engine units)—Korfund spring type, 2 each unit.

# A DOZEN DIESEL YEARS ON MAGNOLIA PIPE LINE

## Typical Station, With Two Alco Engines, Rolls Up 185,000 Engine Hours, Pumps 176,000,000 Barrels of Oil



The Anthony Station is one of eight stations on the Magnolia Pipe Line Company's 10-inch pipe line extending 300 miles from Patoka, Ill. to Lima, Ohio, which was put into service in 1939.

IN slightly less than a dozen years, two Alco diesels in Magnolia Pipe Line Company's Anthony Station have operated a combined total of more than 185,000 engine hours. Driving four-stage Worthington pumps, these 405-hp. engines have pumped more than 176,000,000 barrels of crude oil at a pressure differential of about 680 psi. From November 1939 to September 1951, these diesels ran 89 percent of the elapsed time with an average of only 15 days a year for all maintenance.

The Anthony Station, near Anthony, Indiana, is one of eight stations on Magnolia's 10-inch pipe line which extends 300 miles from Patoka, Ill. to Lima, Ohio, where it ties in to the Buckeye line for deliveries to Great Lakes and Eastern refineries. The line was put in service in 1939 to serve the Salem field in Southern Illinois and later was linked to a new 20-inch Magnolia line from Texas fields to Patoka. The availability of these pipe lines has permitted expansion of the refineries served.

Of the eight stations on the line, four (like Anthony) have Alco's McIntosh and Seymour diesels. Each of these eight engines is a 6-cylinder, 4-cycle diesel of 12½-in. bore and 13-in. stroke rated at 405 hp. at 450 rpm. Each Alco drives through speed increasing gears a Worthington 4-stage centrifugal pump with rated capacity of 1400 gpm. at 905 tdh. at a speed of 2900 rpm. Each of the other four stations has a pair of Worthington diesels rated at 415 hp. at 360 rpm. driving Ingersoll-Rand pumps. There are no spare units, no standbys in the entire system.

The Worthington pumps were teamed with the Alco engines because both are operating below designed capacity and their output can be stepped up greatly merely by speeding up the engine without throwing any undue strain on the equipment. Diesels such as those which deliver 405 hp. at 450 rpm. in these stations are normally run at 600 rpm. with a rating of 540 hp. The addition of an exhaust turbocharger raises capacity to 810 hp. Thus, the engines can produce double the present power output. Operating economy certainly is not ignored but the emphasis definitely is on continuity of service. Refinery schedules must be met and, in the absence of standby equipment, the engines must meet the rigorous operating schedule. To meet these requirements, company engineers have chosen heavy-duty prime movers, good protective accessory equipment and have adopted a methodical program of preventive maintenance.

Station operations are closely controlled from headquarters. Pressure differential is specified precisely from each station by the dispatcher. Pressure regulation is effected by altering engine speed. Operators are required to keep a record of rack travel in millimeters to insure a close check on engine load. Since there are no spare engines, the company has an excellent preventive maintenance program to insure continuity of service. All major maintenance is performed by a traveling crew with work scheduled to minimize interference with pumping quotas. Valves are ground every 14 weeks (about 2,000 hours) and since each station has a set of six extra heads, the entire heads are

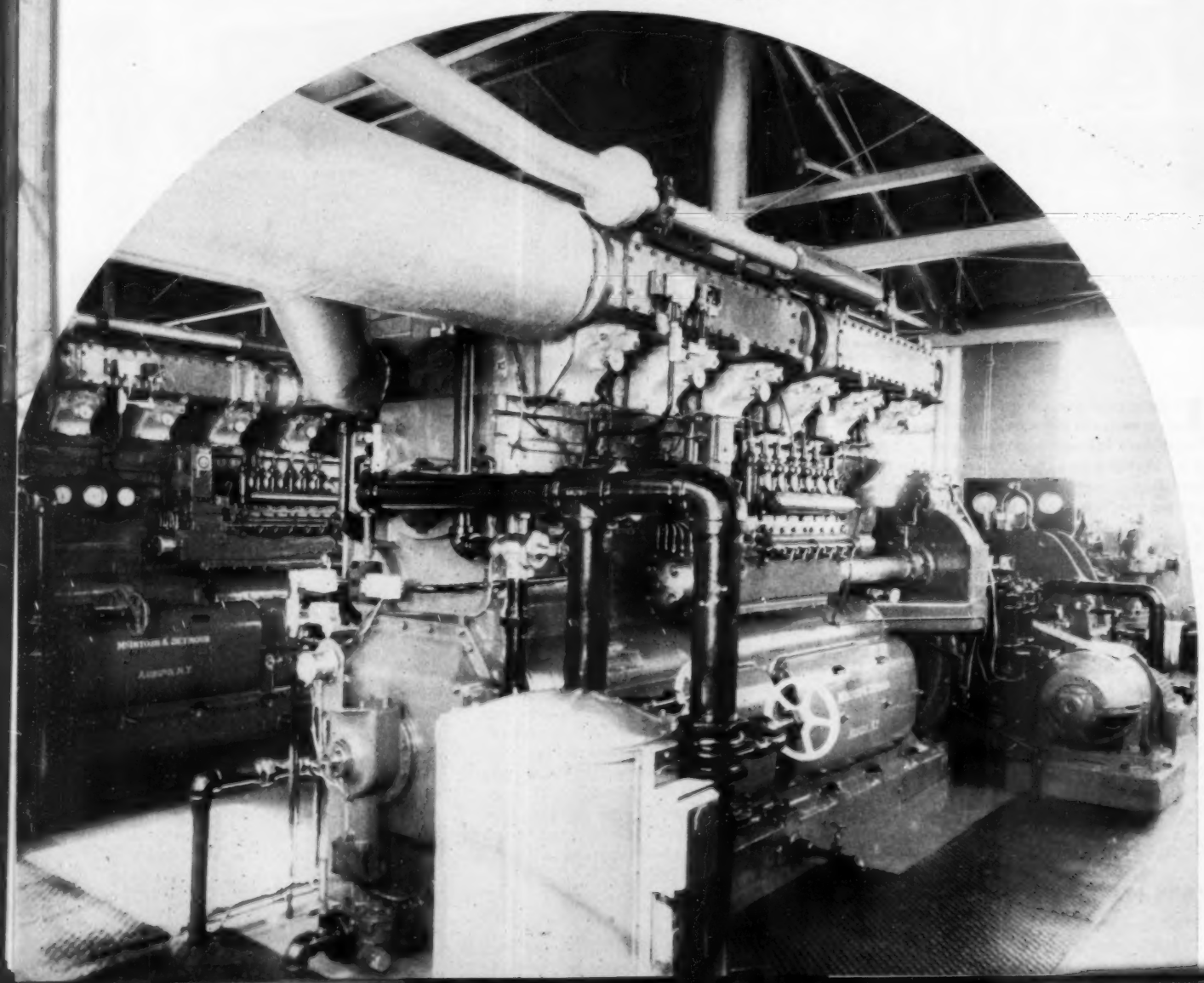
switched and the engine is back in service in just two hours. A fuel injection nozzle can be replaced in a scant 10 minutes. Pistons are pulled only when necessary and some engines have run 2½ years (about 20,000 hours) between such servicings. The company reports excellent experience with the Alco's precision bearings and cast iron pistons. After more than 90,000 hours, more than 80 percent of the original pistons are still in service.

Care is taken to insure an adequate supply of clean lubricating oil. At Anthony, for example, a dual system removes contaminants from the lube. Some of the lubricating oil is bypassed from the engine pressure lubricating circuit through a fuller's earth purifier from which it returns to the crankcase. The engine runs from 500 to 700 hours on a single filter pack. The plant also has a centrifuge in continuous operation serving the two engines alternately for 4-hour periods. Lube consumption has been low and could be lower if management desired it. The Alcos have run as much as 11,000 hp. hr. per gal. of lube consumed but when an engine shows too good a lube oil consumption, in view of the fact that there are no spare units, the mechanics change the ring setup to insure adequate lubrication and are content with 2,000 to 3,000 hp. hr. The No. 1 engine at Anthony consumed 8,408 gal. of lube in 93,581 hours of operation for an average of better than 4,400 hp. hr. per gal. For fuel, the diesels at Anthony use crude oil taken from the line, centrifuged and stored in a 270 bbl. tank. From storage,the oil flows by gravity to two 5 bbl. day tanks in the engine room, then through meters and waste cartridge filters to engine-driven booster pumps which supply the fuel injection pumps. Since the booster pumps operate contin-

**ENGINE HOURS, ANTHONY STATION**

| Year ending Nov. 30 | Engine No. 1 (405-hp. Alco) | % Time Operated | Engine No. 2 (405-hp. Alco) | % Time Operated |
|---|---|---|---|---|
| 1940 | 7,895 | 90.1 | 8,019 | 91.5 |
| 1941 | 7,856 | 89.9 | 7,980 | 91.1 |
| 1942 | 8,165 | 93.2 | 8,223 | 93.9 |
| 1943 | 8,314 | 94.9 | 8,152 | 93.1 |
| 1944 | 7,990 | 91.2 | 7,978 | 91.1 |
| 1945 | 7,829 | 89.6 | 7,947 | 90.7 |
| 1946 | 7,963 | 90.9 | 7,957 | 90.1 |
| 1947 | 7,244 | 82.6 | 7,271 | 83.2 |
| 1948 | 8,005 | 91.3 | 7,411 | 84.8 |
| 1949 | 7,624 | 87.2 | 7,562 | 86.5 |
| 1950 | 7,713 | 88.3 | 7,281 | 83.3 |
| 1951, 11 months | 6,983 | 87.1 | 6,832 | 84.9 |
| Total | 93,581 | 89.6 | 92,624 | 88.7 |

**The Anthony Station, like three more of the eight stations on this pipeline, is powered by two 6-cylinder, 4-cycle, Alco diesels of 12½ in. bore and 13 in. stroke, rated at 405 hp. at 450 rpm. Honan-Crane filter in foreground.**



uously, sending their overflow back to the day tanks, the meter figures on fuel consumption are substantially higher than actual consumption. The meters show that the two Anthony engines used 95,116 bbl. of fuel (42 gal. per bbl.) in pumping 172,224,359 bbl. of oil at a pressure differential of about 680 psi. This is a 12-year average of more than 1,800 bbl. pumped per bbl. of fuel consumed.

A recent month chosen at random shows even higher efficiency. In September, 1951, the engines pumped 1,218,088 bbl. of oil and consumed 504 bbl. of fuel, an average of better than 2,400 bbl. per bbl. of fuel, with suction pressure at 36 psi. and discharge at 715 psi.

It should be noted that each engine also drives a 15 kw. 125 volt dc. generator. Electrical load is such that average generator load on the engine is calculated to be 10 hp. A 260 gpm. centrifugal pump, driven at 2900 rpm. off the speed increasing gears, circulates cooling water through the engine jackets and through heat exchangers where the water is cooled by incoming crude oil. Intake air for the engines is cleaned by oil bath filters. Exhaust gases vent through horizontal silencers. Gases from both engines can be put through a waste heat boiler which provides steam or hot water to heat the station. In case of low lube pressure or pipe line pressure over 800 lb., the engines are shut down automatically by the admission of compressed air to a cylinder which cuts off the fuel. This shutdown device can also be actuated manually from outside the plant.

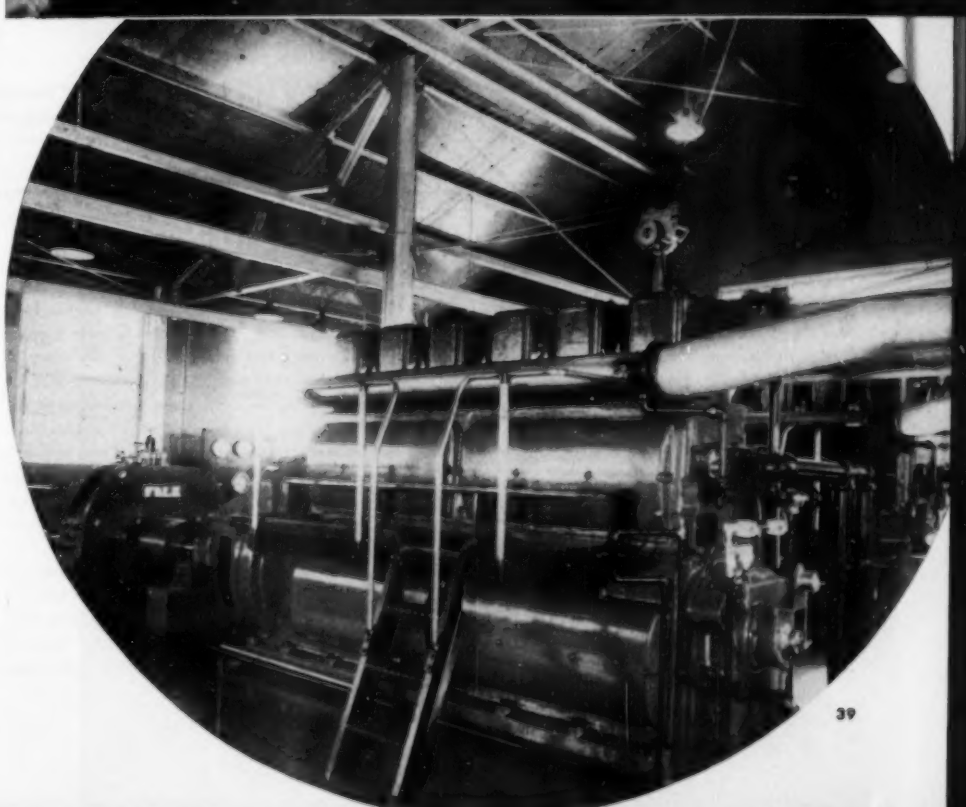
This is a self-sufficient plant. The starting air compressor can be driven either by electric motor or by gasoline engine. The plant also has a 15 kw. diesel-generator set which can provide electricity on the rare occasions when the main diesels are not in operation. The pipe line was designed to handle 38,000 bbl. of oil per day but the actual average over a dozen years has been above 40,000 bbl. The rate of flow during World War II averaged 43,000 bbl. with high periods of 45,000 bbl. per day. In 11 years and 11 months, the diesels at Anthony have run 93,581 hours and 92,624 hours respectively, never less than 82.6 percent of a year and as much as 94.9 percent. Operating at new engine efficiency as a result of a sound preventive maintenance program, the diesels are embarked on their second dozen years of service.

## List of Equipment

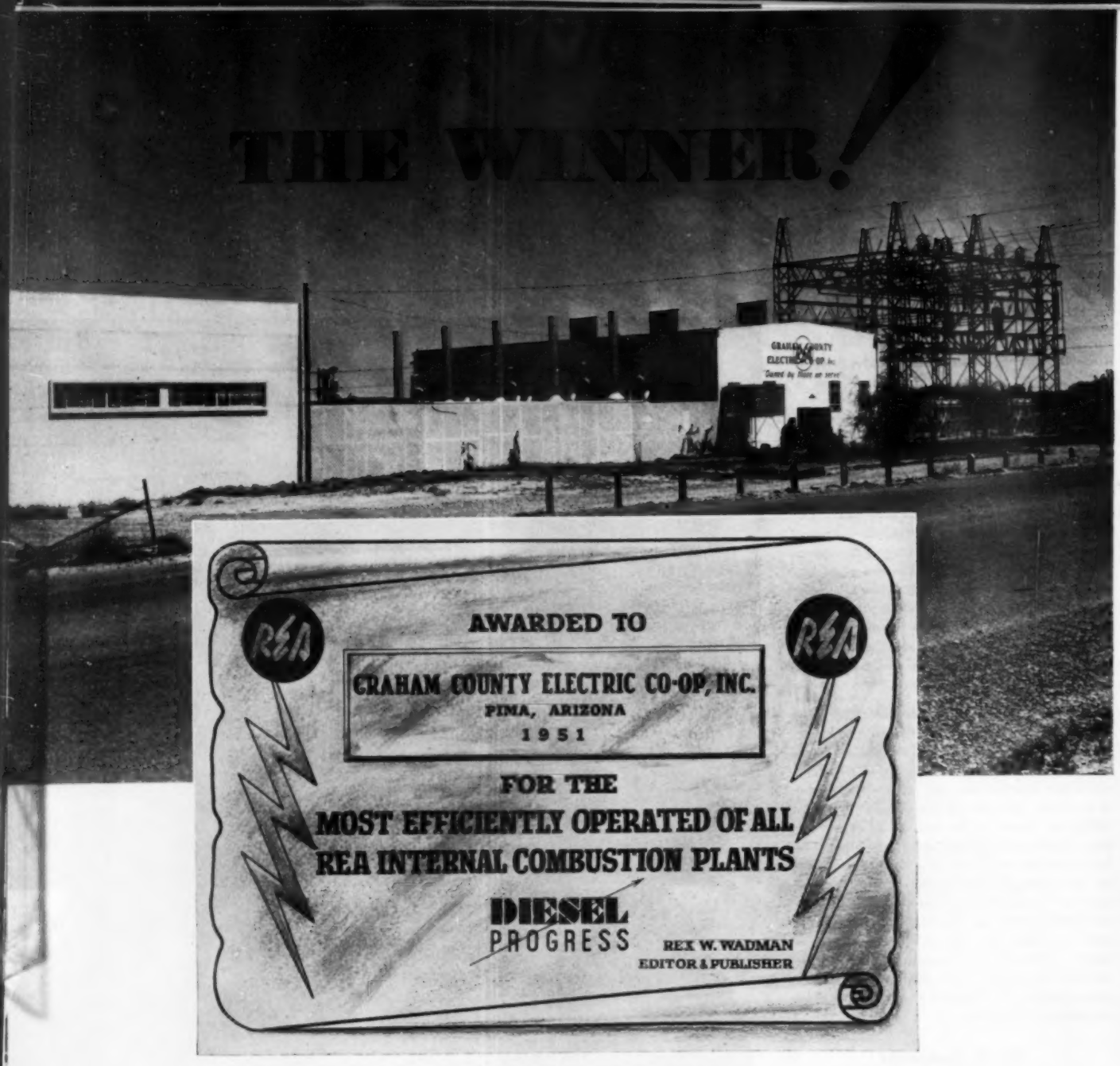
Engines—Two 405-hp., 6-cylinder, 4-cycle, 12½ x 13-in. McIntosh & Seymour diesels operating at 450 rpm. American Locomotive Co.
Pumps—Two 4-stage, 1400 gpm. centrifugal pumps. Worthington.
Fuel oil centrifuge—DeLaval Separator Co.
Fuel meter—Worthington Gamon.
Fuel filters—Nugent.
Fuel injection pumps—American Bosch.
Lube oil—D.T.E. No. 3. Socony-Vacuum.
Lube reclaimers—Honan-Crane.
Lube strainers—Cuno.
Waste heat boiler—Sims.
Air filters—American Air Filter.
Heating system—B. F. Sturtevant.
Pyrometers—Brown Instrument.
Governors—Woodward.
Generators—General Electric.
Lube oil centrifuge—DeLaval Separator Co.
Heat exchangers—C. F. Braun Co.
Water circulating pump—Goulds.
Exhaust silencers—Maxim.
Speed increasing gears—Falk.
Fuel booster pumps—Tuthill.
Air compressor—Worthington.
Air compressor motor—Westinghouse.
Gasoline engine—Wisconsin.
Tachometer—Reliance.
Pressure gauges—U. S. Gauge Co. and Crosby.
Switchboard—Westinghouse.
Diesel-generator set—Caterpillar with G.E. generator.

**In the 11 years and 11 months that the two Alcos have been operating in the Anthony Station they ran a combined total of more than 185,000 engine hours and pumped more than 172,000,000 bbl. of crude oil at a pressure differential of about 680 psi.**

**Each of the two Alcos drives through speed increasing gears a Worthington 4-stage centrifugal pump with rated capacity of 1400 gpm. at 905 tdh. at a speed of 2900 rpm.**



# THE WINNER!




COMMENCING this year of 1952, DIESEL PROGRESS will present a bronze plaque each year to the Rural Electrification Generating Plant most efficiently operated during the preceding twelve month period. Efficiency being measured by the ability of the plant management to turn British Thermal Units contained in whatever fuel they use into usable electric energy.

The plaque this year went to the management of the Graham County Electric Co-op, Inc., Pima, Arizona, whose president is W. A. Batty, Secretary Ray Alder and Manager Howard Helmers. Details of the actual presentation of the plaque at Milwaukee on May 8th appear later on in this issue.

The Graham County Electric Cooperative, Inc., was organized July 15, 1946, to provide electric power for rural consumers in the fertile valley of the Gila River in Southeastern Arizona—one of the most productive small agricultural areas of the entire southwest. The area served is 45 miles long, varying in width from 8 to 10 miles, and contains approximately 35,000 cultivated acres. Principal crops are cotton (both short and long staple varieties) and alfalfa and small grains.

The Cooperative was formed by an acquisition of rural properties from the Arizona General Utilities Company and local lines of the Sulphur Springs Electric Cooperative, Inc., Willcox, Arizona. Charles H. Seeman was hired as the first manager of this cooperative. Mr. Seeman is now manager of the Jemez Mountain Electric Cooperative at Espanola, New Mexico. It started with 1025 consumers and has expanded its system until at the present time it is serving 2100 consumers with approximately 366 miles of distribution line. As the Gila River provided an uncertain source of water supply, farmers in the area turned to underground water to augment and insure their irrigable crops. The availability of electric power for irrigation pumping was a principal factor in hastening this trend and assuring the economy of the area. Last year, under the most adverse drought conditions, with no natural irrigation flow available from the Gila River, a record cotton crop was marketed valued at $5,970,910.

**The winning team. Back row, left to right, Howard Helmers, Manager; Berry West, David Allen, William Kiefler, Operators. Kneeling, left to right, Grover Windsor, Chief Operator; Norace Whitecotton, Donald Johnson, Operators.**

Guy Anderson, local farmer and attorney, stated, "Cotton production in the valley during the past season alone would have been halved had it not been for power for pumping supplied by our electric cooperative." "The REA has been a great boon to the production of agricultural products in Graham County," stated S. L. Owens, County Agent. "It has made the pumping of irrigation water for use on our farm crops much easier, and more simplified. The touching of an electric button to start a stream of water has fascinated our farmers. The change-over from other methods of pumping water to pumping by electricity has been general."

"This has been mostly because of the ease of operation of electric pumps and the decrease in maintenance costs and upkeep over other methods of pumping. The use of electrical power has facilitated the operations of feed mixing plants, feed grinders, cooling systems for dairy barns, and the refrigeration of milk and other perishable products. Electricity has also facilitated the operation of hatching and brooding equipment for baby chicks and turkeys. It has provided light for milking sheds and other farm buildings and farm yards. The farmers' homes have been made more comfortable through the use of modern electrical home equipment, as well as the provision of light for the home."

Originally power was purchased from the Safford Municipal Utilities, largest town in the area, but this source soon proved inadequate for increasing demands. Early in 1947 the Cooperative began construction of its own generating plant at Thatcher, Arizona. A contract with the Cooper-Bessemer Corporation was executed on January 20, 1947 for the installation of two type JS, 6-cylinder atmospheric gas-diesel engines to drive two 400 kw. generators and one type JS 8-cylinder engine to drive a 500 kw. generator. The first of these engines was placed in service on July 7, 1947, something of a record, considering the shortage of materials during this period. By the end of the year it was seen that additional capacity would be needed and a contract was executed with the Cooper-Bessemer Corporation to install two additional type JS 8-cylinder supercharged gas-diesel units to drive an 800 kw. generator each. The first of these units was placed in operation on August 30, 1948 and the second on October 20, 1948. On July 26, 1949 a contract was executed with the Cooper-Bessemer Corporation to supercharge the first three engines, thereby adding an additional 700 kw. to the plant capacity. Almost half of the plant's kwh. production is used by irrigation consumers. The irrigation season extends from March through November, usually peaking in July. Seven cotton gins, a cotton oil mill, and a meat-packing

**The five Fluor mufflers, with American Cycoil hiding in the background. To right, partial view of Young Radiator heat exchangers.**

plant provide an industrial load during the off-season winter months for a good yearly load factor.

Growth of the load (since the plant has provided the entire source of power) can be seen from the following:

### GROSS PLANT PRODUCTION

| | |
|---|---|
| 1949 | 5,503,500 kwh. |
| 1950 | 11,859,610 kwh. |
| 1951 | 18,235,950 kwh. |

Peak month's production can be seen from the following:

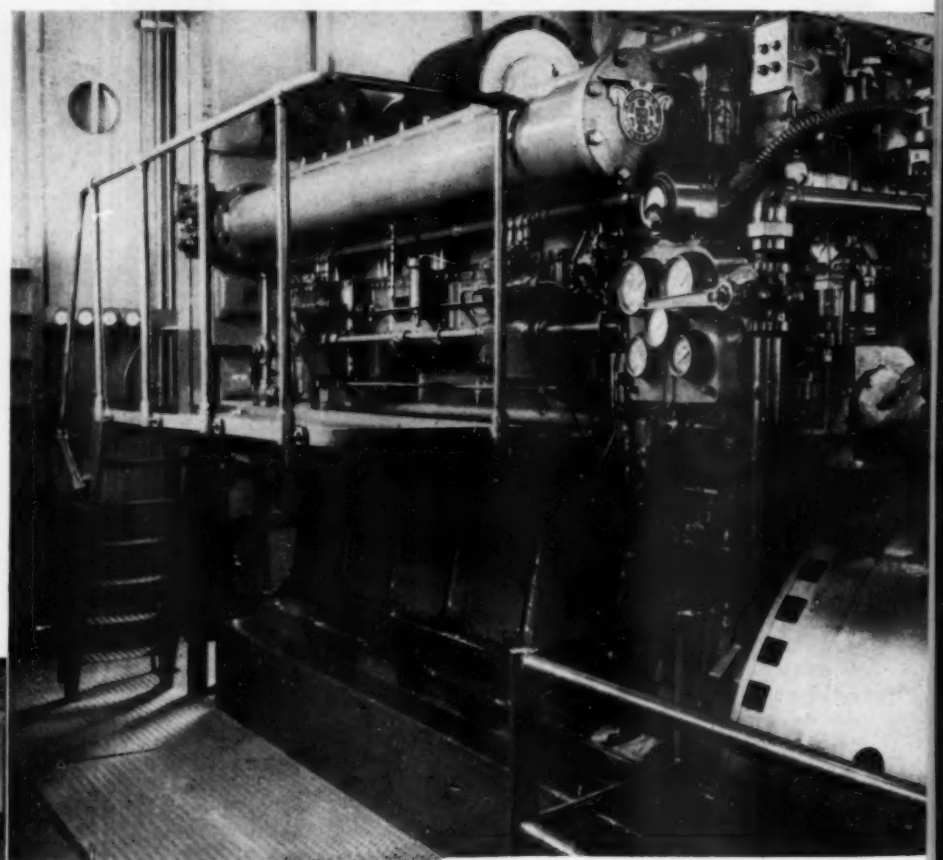
| Year | Mo. | Gross kwh. | Max. Demand |
|---|---|---|---|
| 1949 | Sept. | 724,200 | 1880 |
| 1950 | July | 1,356,700 | 2900 |
| 1951 | July | 2,237,000 | 3820 |

Now let's take the words of Manager Howard Helmers. "Production of 18,236,000 kwh. during the year with a 3600 kw. plant produces the type of load conditions conducive to operations at a point of maximum efficiency. Load conditions of this type also require operation at a maximum of proficiency. Our engines and equipment have given remarkable performances and have required a minimum of maintenance. We also follow a planned maintenance program. Our chief operator keeps an individual log on each engine unit and item of equipment and maintenance work performed—enabling him to forecast the need for required maintenance and to accomplish this work at convenient periods. Even though all engine units were loaded beyond rated capacity during daily peaks through the irrigation season, excellent equipment, plus planned preventive maintenance, enabled us to operate without a single enforced shutdown throughout the entire year.

"Our 1951 operating record indicates our Cooperative's faith in purchasing gas-diesel engines when these were still somewhat new in stationary power

### COST COMPUTATION OF NET ENERGY GENERATED 1951

| Expense Items | Total Dollars | Mills per net kwh. |
|---|---|---|
| Operations, Supervision & Engineering | $ 3,304.83 | .19 |
| Station Labor | 17,742.84 | 1.01 |
| Fuel, Oil | 14,250.66 | .81 |
| Fuel, Natural Gas | 33,251.04 | 1.91 |
| Lubricating Oil | 6,290.21 | .36 |
| Other Operating Supplies & Expenses | 3,028.09 | .17 |
| Miscellaneous Maintenance | 3,157.21 | .18 |
| Total Production Expense | $ 81,024.88 | 4.65 |
| Overhead Costs | | |
| Depreciation | 16,265.18 | .93 |
| Taxes | 6,898.96 | .39 |
| Interest | 10,514.90 | .60 |
| Insurance | 3,261.08 | .18 |
| Total Overhead | $ 36,940.12 | 2.11 |
| Total Production Cost | $117,965.00 | 6.76 |

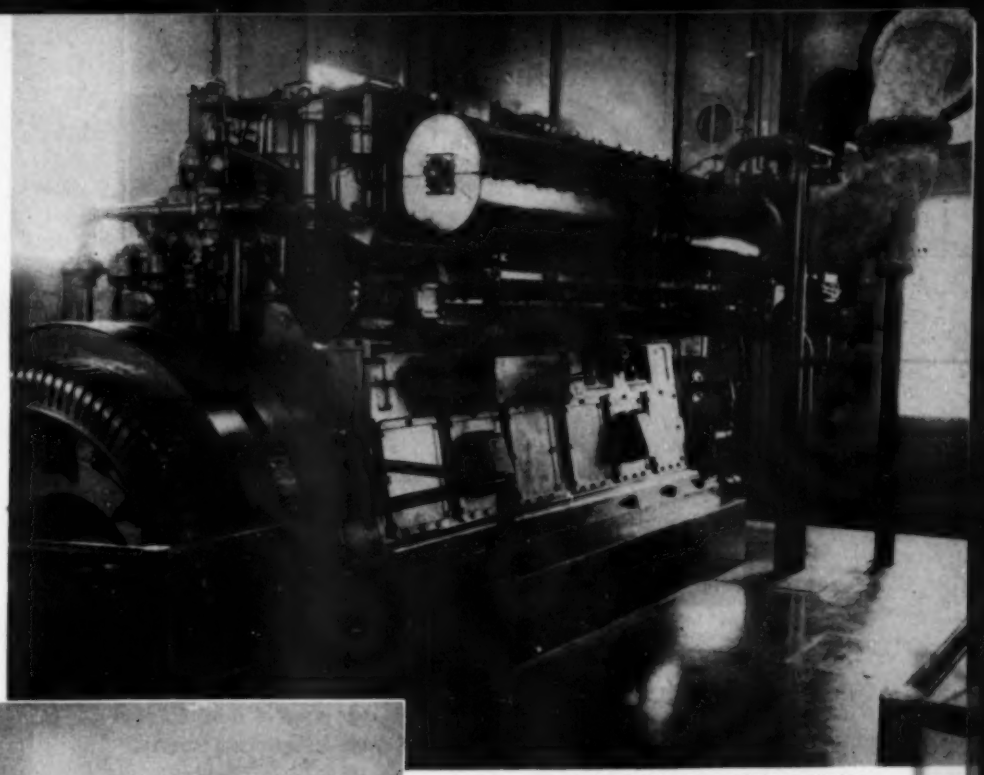


This shows four of the Cooper-Bessemer engines at Pima, Arizona REA plant. The fifth is off the edge of the photograph. Note Elliott generators, Woodward governors, and Alnor pyrometers.

plant service. The selection of supercharged engines, units four and five, have proven an excellent one, which we felt justified us in the supercharging of the original three atmospheric gas-diesels in this plant. Our 1951 operating records seems an excellent indication that supercharged gas-diesel engines for stationary power plant service are now to be considered a conservative and trouble-free design. Supercharged engines for power plant loads work out very well, since the fuel consumption curve between a half load and a full load is nearly flat, thereby enabling you to obtain equally good fuel consumption, between the range of 50 and 100% load factor."

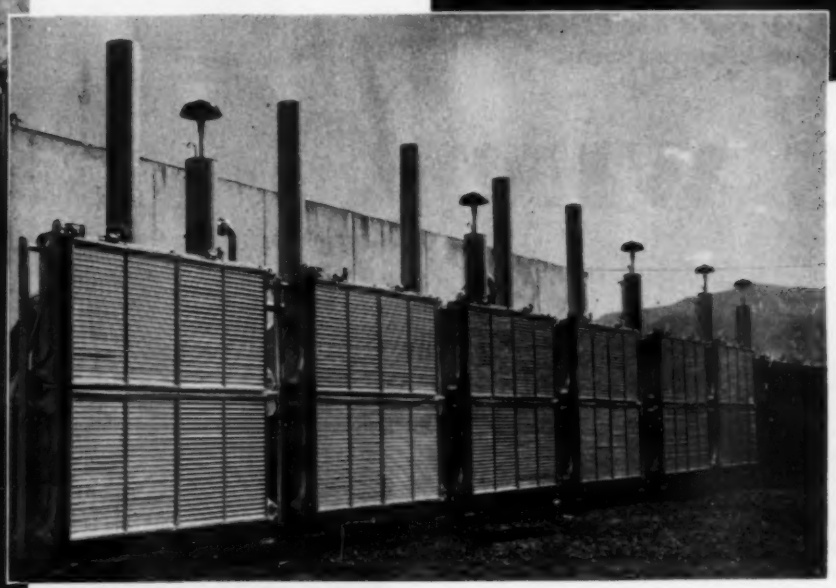
"A major contribution to our plant's operating record has been the proficiency of our operators in keeping a high load factor on the units in operation. Careful attention has been given by them removing units from the line as soon as load conditions permit. Study of past performance and peaks has enabled the operators to satisfactorily anticipate daily load requirements and thereby avoid premature warm-ups or the carrying of an unloaded unit on the line for emergency purposes. We are proud of our housekeeping. Each operator has made it a point of personal pride to keep assigned engines, equipment, and floor space clean and in first class operating condition. Other contributing factors are continuous supervision and inspection of lubricating oils and careful check of our automatic temperature controls."

"Chief Operator is Mr. Grover Windsor, who has been employed by the Cooperative since the first unit was placed in operation in 1947 and has been Chief Operator since May 1, 1948. Mr. Windsor had had two years of operating experience in the power plant of the municipal utilities at Safford, Arizona prior to joining the Cooperative. Five operators compose the remainder of the plant personnel, three of whom, W. L. Kieffer, Berry West, and Norace Whitecotton, have been employed since the inception of the plant. Two operators, Donald Johnson and David Allen, are completing their first year of service."



Exhaust side of one of the 6-cylinder Cooper-Bessemer 13 in. x 16 in. gas diesels rated at 905 hp. at 450 rpm.—sea level. This is the first engine installed back in 1947. Note Electric Machinery generator.

Close-up of one of the Model JS-6-GDT 4-cycle, turbocharged Cooper-Bessemer gas-diesels at Pima.



One Model HC-1240 Horizontal Coil cools engine #1; two Master Series Model 232 cool Engine #2; six Master Series Model 296 cool Engines # 3, 4 and 5 (2 per engine), all supplied by Young Radiator Company. Radiators cool both jacket water and lube oil. All have shutters to maintain jacket water and lube oil temperatures within three degrees.

## 1951 OPERATIONS*

| Unit | HP.* | KW.* | Hours Operated This Year | Hours Operated To Date | Gross Gener. in 1000 kwh. |
|---|---|---|---|---|---|
| 1 | 856 | 600 | 2652 | 11,951 | 1,245.3 |
| 2 | 856 | 600 | 4755 | 15,836 | 2,182.5 |
| 3 | 1143 | 800 | 6505 | 14,329 | 4,160.4 |
| 4 | 1143 | 800 | 7700 | 21,450 | 5,143.5 |
| 5 | 1143 | 800 | 8257 | 22,411 | 5,504.3 |
| Gross Generation | | | | | 18,236.0 |
| Station Service | | | | | 794.4 |
| Net Generation | | | | | 17,441.6 |

*Ratings based on 3300 feet elevation.

## List of Equipment

Engines—3 Cooper-Bessemer JS-8-GDT 4-cycle Turbocharged Gas-Diesel 13 x 16, 1208 hp. at 450 rpm. at sea level. 2 Cooper-Bessemer JS-6-GDT rated at 905 hp. at 450 rpm. at sea level.
Generators—#1 engine Electric Machinery, 500 kw, other four engines Elliott, one 600 kw. and three 800 kw.
Turbochargers—Elliott.
Governors—Woodward.
Fuel oil filters—Purolator and Luber-Finer.
Lube oil pumps—Viking.
Lube oil filters—Nugent and Luber-Finer.
Lube oil strainers at engine—Cuno.
Heat exchangers—Young Radiator for lube oil and water.
Fuel gas—El Paso Natural Gas Co.
Fuel meters—Emco.
Fuel gas regulators—Emco.
Air compressors—Quincy.
Air intake filters—American Air Filter Co. Cycoil.
Exhaust mufflers—air cooled—Fluor.
Flex. Exhaust connections—American Metal Hose.
Engine controls—Westinghouse Air Brake.
Pyrometers—Alnor.
Piston rings—American Hammered-Koppers.
Main switchboard—Electrical Machinery.
Engine alarms—Viking and Fulton-Sylphon.
Welded fittings—Tube Turns.

Diesel *City of New Orleans* crossing the Ohio River at Cairo, Ill.

### Illinois Central Brings Diesel and Coal Fired Steam To The Historic Coin-Flipping Stage

# DIESELS WIN

*By* CHAS. F. A. MANN

AT the beginning of its second century of service to the great central belt of states stretching from the Great Lakes and western Iowa to the Gulf at New Orleans, the Illinois Central Railroad inevitably, within the next two years, will carry the flag for some far-reaching progress in the evolution of railroad motive power.

The "Mainline of Mid America," with its 6500 mile network of lines through the rich heart of the nation, has just finished a 25 year battle of reconstruction so complete and so comprehensive, that at whatever point it is analyzed it smacks of 100% Yankee ingenuity and thoroughness, plus the far-reaching determination not only to keep itself thriving for a second 100 years, but to prove to the rest of the nation that no highway, riverboat, airline or pipeline development in the foreseeable future will rub out the railroads, much less the Illinois Central Railroad.

A great dividend payer, once it finally reached the typical financial impasse of the depression, found itself face to face with either setting out on a vast internal housecleaning and general barrel-bottom scraping program, or face the usual fate of the railroad industry in the depression years. For twenty years no other system in the USA held so rigidly to an old-fashioned Yankee program. Its bonded debt was scaled down $177 million to its own plowed back earnings. Its equipment was overhauled, modernized, scrapped and revamped on a wide scale system so that everything worth saving was saved in the grand scale and everything worth scrapping was converted to cash. Its physical property, including its vast network of expensive river bridges, viaducts and trestles and magnificent straight trackage was brought up to the highest standards known on the continent.

While Illinois Central was one of the few U.S. railroads to show heavy annual increases of valuable coal tonnage—it rose 80% while the nation's coal average on the rails rose only 8%—the Illinois Central was one of America's first railroads to test diesel, way back in 1936 with the original Green Diamond. Serving the great southern Illinois and western Kentucky coal fields, Illinois Central has built up by accretion, conversion, modernization and building in its own great shops at Paducah, Ky. one of the largest fleets of high power, high speed coal fired steamers of any railroad in the world, the Pennsylvania not excluded. Because of certain economics and geographic features peculiar to Illinois Central, plus the fact that the whole system lies in a well watered, fairly level country, its Yankee policy of sticking by its principal shipper—the coal people, and building up its modernized, efficient fleet of coal burning freighters, has, even in 1950 and 1951, been able to show operating ratios comparable to the most efficient diesel railroads in the nation!

This does not conceal the greatest fact of all, which President Wayne Johnson boldly admits may be the greatest forward step for his company: The operating success the Illinois Central has enjoyed up to now with the preponderance of freight hauled by steam, means that all the greater savings that diesel may bring the system lie ahead of it! 82% of Illinois Central passenger service by the end of 1952 will be diesel. 80% of Illinois Central switch service will be diesel by the end of 1952.

100% of its famed suburban service, which carried nearly 45,000,000 passengers last year is electrified. Yet almost 100% of its tremendous freight volume is coal-fired steam!

Few American railroads had a fleet of steamers equipped for war work in 1940 comparable to the Illinois Central. While most of the other U.S. systems had to rush out and buy steam and diesel to keep going, I.C. had but to re-do its entire switching and passenger operation and keep rolling along —using the capital funds to buy back those bond issues and bring the debt down to where never again would bankruptcy threaten the Illinois Central. But those steamers are wearing out—all 1100 of them. So, this great, solid railroad paradox is the focal point for all motive power interest in the next 24 months. What course will the IC take?

The company has joined other coal-hauling systems in the development of that old diesel debbil the powdered coal gas turbine electric locomotive, the first of which was supposed to be ready for unveiling. As is already widely known, the thermal efficiency may be low, but so will the price of coal, and on the chance that it might even equal the cost per gross ton mile of a diesel in operation, the I.C. is waiting patiently for the results. Meanwhile the company is prepared for what may come. Its coal-handling facilities are in perfect shape, are of modern, economical design and spread throughout the whole system. Unlike most all other systems, the I.C. already has its investment in coal facilities in and paid for. So is its small, but efficient diesel setup.

But, if necessary to keep rates in line it can quickly start hauling coal trains with diesel. Meanwhile coal is 40% of the total tonnage handled, and accounts for 20% of the freight revenue.

A look at the map of the fabulous territory served by Illinois Central at once indicates the unique character of the territory served. From one end of the whole system to the other it is an almost

perfectly balanced area of tremendous mechanized agriculture—wheat, corn, livestock and farm products in the North; cotton, sugar, forest products, etc. in the South; big diversified industry on the north and south side and mid-size diversified industrial production everywhere else. Even the tips of its important feeder lines reach heavy volumes of other traffic at every point. Obviously, then, it becomes certain that if coal fired motive power remains economic for handling the tremendous coal tonnage, there is 50 or 60% of the remaining freight tonnage requiring speed and heavy trainload volume—bananas, for example, in trainload lots from New Orleans, that lend itself to 100% diesel power. So, what the Board of Directors of the Illinois Central decides in the next 8 months will add another big chapter to the U.S. railroad operating history.

Perhaps the greatest good to evolve from the shrewd Yankee rebuilding of the Illinois Central was the weeding out and elimination of 100% of the passenger service on 47.2% of the total railroad mileage. Systematically, by shrewd moulding of public opinion, it whittled away its profitless branchline and useless intermediate passenger train service with scientific precision and few collisions with public opinion, or the local Chambers of Commerce. Once these impediments to fast freight and passenger service were eliminated, it set about scientifically to build back a newer and finer passenger service that the public would support. It worked as hard to get rid of the jerky locals as it did to bring the modern service people would patronize. Unlike many railroads, it didn't just quit the passenger business for good. It realized the long-range benefits of getting more people to ride more miles and go away boosters, rather than ride competing forms of transportation and then maintain interest in shipipng their freight by a railroad they never saw or used personally.

Few U.S. railroads have a commuter rail haul problem like the Illinois Central. It is the daily lifeblood of business for 75,000 Chicagoans living on the South Side. One fourth of all passenger revenues of the I.C. originate on what amounts to one of the shortest large railroads in the world—the 37.93 miles of electrified I.C. suburban line separately operated and running parallel to its mainline operations, from the mouth of the Chicago River almost in front of Col. McCormick's Tribune, closely paralleling in a landscaped trench, stately Michigan Avenue and on through the beautiful South Shore Park area. This midget electric railroad has evolved from daily suburban service first started between Chicago and Hyde Park 96 years ago. It reached a spectacular climax during the first World's Fair in 1893 when 40,116 special Fair trains carried nearly 9,000,000 passengers, in addition to 36,600 regular suburban trains carrying 9,358,000 regular passengers in the period from May 1 to October 1, 1893! In 1926 this suburban service was completely electrified with a fleet of 140 multiple unit power cars and 140 multiple unit trailers, the outcome of which was the erection of thousands of large apartments and many thousands of homes along its clean, quiet fast suburban lines that gave the whole of Chicago's famed South Shore a billion dollar lift. While traffic has declined from its 1946 peak, it still remains as the source of one fourth the I.C. total passenger income. In 1950 it amounted to $6,500,000. Soon, under an Air Rights leasing arrangement, Prudential Insurance Company will build a giant, skyscraper facing Michigan Avenue, with its own I.C. terminal in the basement!

With such a background of electric operation, complete with a full shop organization, the I.C. easily and with no prejudices, swings its management viewpoint toward diesel, for electric and diesel are the Siamese Twins of 20th century rail motive power. It thus follows, that despite the tremendous economic favoritism that its flat-country trackage, bursting with every reason to keep on using coal-fired steam, has given the Illinois Central, that what it has done with diesel so far has been done with the coolest, most calculated motives that could possibly arise on any railroad. In stepping up its declining passenger service, the advent of the dieselized original Green Diamond, a three-car day train, became the forerunner of what now is practically a full system diesel operation passenger wise. Next, because of its big city terminal problem, the most natural thing for the I.C. to do to help eliminate smoke and noise in its Chicago front-yard terminal was to 100% dieselize outside its 100% electrified suburban operation. So, the I.C. went diesel switching almost all the way. As simple as that. No sentiment. When certain operations demanded diesel, the I.C. went diesel in a big way.

More than $12,000,000 has been poured into the I.C.'s ultra modern streamliner passenger fleet in the past 12 years. All of the name trains are diesel powered. Equipment on the Florida trains now running two days out of three through to both east and west coast of Florida; the twin City of New Orleans day streamliners that gross better than $6 per mile; the world famous pair of Panama Limiteds that run overnight in each direction between Chicago and New Orleans; the three Chicago-St. Louis streamliners and the Land O'Corn coach streamliner to Waterloo, Iowa, are all full of the ultras of modern passenger train design and are diesel equipped.

Uncluttered by diversity of motive power types or makes, the I.C. runs its entire diesel passenger service with 30 General Motors EMD units of the 2000 and 2250 hp. passenger type, each with a pair of 12 cylinder diesels. Out of the fleet of EMD units, 8 of them are the new high-power 2250 hp. series purchased in 1950 and 1951. The fleet includes four diesels that date back to 1941, the rest coming along in batches annually ever since. High daily mileage is built up by careful, tight utilization and by restricting all maintenance routines to Chicago terminal layovers where all work is speedily performed on schedule at Burnham Shops, where all diesel heavy maintenance for the whole system as well as all electrical maintenance for the suburban cars is concentrated for efficiency. From 25,000 to 28,000 miles per month is run by the whole fleet. The flat topography permits many of the runs to be made with a single unit, while all heavy trains carry two units.

Not only the flag-bearer of the Illinois Central fleet, but also rated as one of the nation's most notable pairs of day streamliners, the City of New Orleans, which make a daily trip of 921 miles between Chicago and the Crescent City, have set new records of on-time performance and gross revenue since the day they began service. Making 23 intermediate stops, these trains, with an average of 13 cars and two 2000 hp. EMD Diesel units, make the run in just under 16 hours. In a typical August 1951 day they carried an average between them of 550 revenue passengers, while in a January, 1952 "low" day, they averaged out 360 revenue passengers. De luxe service across a band of important mid-America cities from the Gulf to Lake Michigan is thus given by two single trains, including pickup and setout cars in both directions for St. Louis. Matching these streamliners on the overnight run are the 16 car Panama Limiteds that so far have given their passengers such a quiet, smooth ride that not even the airlines have made a dent in their popularity.

Meanwhile as of January of this year, each City of New Orleans train has rolled up 1,630,000 miles apiece and their popularity is as great as ever. The City of Miami trains continue to be the preferred Florida trains out of Chicago, and operate via the I.C., Central of Georgia, Atlantic Coast Line and Florida East Coast. The slower day train, the Seminole, has been speeded up since diesel engines were put on.

The famed old original Green Diamond was retired in October 1949 after rolling up 2,282,463 miles behind its 1200 hp. diesel plant. The new Green Diamond went into service to St. Louis in 1947, and with its dieselized daylight run, it has pulled heavy business on the highly competitive Chicago-St. Louis run, dominated by the Alton since railroading began.

Before a dip into the operating results of the I.C.'s small but active passenger fleet, a glance at the diesel switching picture is of intense interest, because, like the passenger diesels, diesel switching is thinly spread over a huge railroad system where their showing is outstanding, if not downright phenomenal. After all, to put 130 diesel switchers to work among a giant fleet of 1100 steamers of all sizes and shapes, there must be a reason that can even satisfy the grim, shrewd I.C. management.

Diesel switchers and road transfer units are assigned to 13 key terminals on the system. Greatest number are used at Chicago, Memphis and New Orleans, the largest group by far being at Chicago, where they do industrial switching, yard switching and heavy transfer work between downtown Chicago and Markham Yard, 20 miles out on the main line. The bulk of all I.C. switchers are again standardized General Motors EMD units. Largest are the 8 "Cow and Calf" transfer diesels where two 1000 or 1350 hp. units are coupled together permanently, one minus the cab, to give a permanent high powered road transfer unit that will push a heavy freight 15 or 20 miles per hour without help.

I.C.'s fleet consists of 19 600-hp.; 102 1000-1200 hp., 1500 hp., and the 8 "Cow and Calf" combines. As of October last, 48 of them were used in

the Chicago terminal, largest on the system, and where their over-all advantages show off best financially and mechanically.

Last October the company made a thorough cost study of the existing Illinois Central fleet of 130 diesel switchers, then projected it against their fleet of 20 remaining steam switchers used in the same Chicago Terminal area, coming up with some startling comparisons. Let's look back to the month of August for certain basic statistics, largely because this was a typically representative month—not the lightest nor the heaviest month of the year. Total switching hours worked were approximately 73,000. Projecting this as a median month, this would bring the 1951 switching hours for the system diesel switcher fleet to 876,000. Assuming the costs for Chicago Terminal represent a fair average at other points, the projection for the year 1951 turned up as follows:

PER ENGINE HOUR

| | Steam 1951 | Diesel 1951 |
|---|---|---|
| Fuel | $ 2.1620 | $ 1.1104 |
| Water | .2177 | nothing |
| Lubricants | .0834 | .2157 |
| Other loco. supplies | .0995 | .0356 |
| Wages—Engine & Motormen | 4.1714 | 3.9225 |
| Wages—Engine & Motormen | 4.1714 | 3.9225 |
| Enginehouse expense | 2.3675 | .5883 |
| Repairs to locomotives | 2.5402 | 1.6143 |
| | $17.9320 | $13.7771 |

Thus the saving in diesel over steam in 1951, per switching hour is 23.2%.

On the basis of the system diesel switcher fleet of 130 units, working 876,000 hours per year, at a saving of $1.1549 per hour, aggregates $3,640,000! These locomotives represent an actual investment of $12,873,000 and the saving on operating costs alone therefore represents a return on the investment of 28.3%. This fleet worked 74.4 percent of available hours and were available for 19.2% added hours when they were not needed, giving an availability figure of 93.6% compared with a steam switcher availability figure of about 50%. What more neatly shows what can be done with diesel, even if it were possible to supply coal free of charge to steam switchers?

The key to operating success of road passenger diesels on the Illinois Central is high daily mileage and 100% availability. Part of their success has been due to the long large background of experience with electric motive power and the handy location of the chief electric-diesel shop right in Chicago at the terminus of most of the key South, West and Florida runs. With some passenger units making 28,000 miles per month and many switcher and transfer diesels running up to 720 hours per month, it takes a keen shop organization and a tight preventive maintenance routine to keep things moving smoothly. All heavy diesel maintenance is at Burnside Shops, ideal for the job. Road diesels are maintained on a mileage basis and yard diesels on a basis of need and condition. Unit exchange system of parts replacement is heavily employed, at both Burnside and Memphis, the latter point carrying spare trucks, motors, auxiliary generators and some assemblies for quick road repairs.

All overhaul and rebuilding is done at Burnside for the entire system. As each part comes in for rebuild, the latest improvements in technique and materials are applied. Portions of roundhouses at each point where diesels are used are converted into diesel facilities for servicing. The 27th St. Roundhouse in Chicago being one, though not far from the Burnside general shops. Thirty-three fueling stations located at 26 points on the road handle all fuel, lube, sanding and road service. Crankcase oil is reclaimed at Burnside and sent out for use in switchers after completing one life cycle in the road diesels.

Passenger Locomotive Maintenance. Diesel road maintenance costs on the I.C. are interesting, in that they represent a combined fleet of standard EMD passenger units dating from 1941 to the Spring of 1951, when the latest 2250 hp. versions joined the parade. Total mileage by units accumulated from the date of entering service to December 31, 1951, range from a high of 2,565,089, for No. 4004, a 2000 hp. EMD unit purchased in December 1941, down to a mere 167,535 miles accumulated on Unit. No. 4025, a new type 2250 hp. EMD with the latest on it. The statistics show a range in miles for the month of December 1951 from a high of 27,222 miles for Units No. 4005 and No. 4006, way down to 7,485 miles for Unit 4018. The average for the entire fleet of road passenger diesels came close to 22,000 miles, however, for a grand total of 634,060 unit miles during December, 1951. Grand total of miles accumulated to Dec. 31 for the entire I.C. passenger fleet was 35,407,946, from December 1941. This hits about 3½ million miles per year average straight through.

Maintenance costs are interesting for the single month of December, 1951 as well as for the whole year. They vary widely in the month, in fact get so far out of line on one unit as to indicate a serious wreck or bad damage. The best record for the month was made by a 1946 Unit, No. 4102, which ran 20,442 miles in December, 1951 with a maintenance cost of only 4.5 cents per mile! About half the balance of the fleet stuck close to a 15 cent per mile cost while the others were way down in 6-8 cent per mile bracket. The year 1951, however, shows a much broader trend of maintenance costs on diesel. The very oldest diesel units—and this is important—showed a remarkably low maintenance cost for the year—normally it would be expected that the older units would show up more costly than the new ones, but, with the preventive maintenance routines being followed precisely, they averaged out far better than poorly maintained brand new units that have been worked to death with too little put back. Results on the Illinois Central for 1951 were excellent and clearly indicative of careful, well planned and highly skilled maintenance routines in line with the best practice on any U.S. railroad. If all railroads kept track of things exactly like the I.C. does, it would be interesting to compare their results. The total Road Passenger Miles run in 1951 for the entire fleet was 7,313,695 miles. Total labor cost for maintenance was $764,019. Total material cost was $459,112, giving a grand total maintenance expense of $1,223,131, or 16.7 cents per locomotive mile.

Thus the Illinois Central treats its growing diesel fleet with precision and care. It has made each part of its existing diesel program work well and economically and render the greatest amount of service per dollar invested. This from a great coal railroad operating in a territory where nature favors steam in many ways—well watered flatland is ideal country to wring the most out of the old Iron Horse—it shows its very worst in the mountains and curve country—speaks highly of the I.C. management who have planned and built so well to carry on in their second century of service to mid-America.

**"Cow & Calf" transfer diesel used between the Chicago Terminal and Markham Yard with Conrad Hilton hotel in the left background, Blackstone hotel adjoining.**

# PIONEER UTILITY PLANT

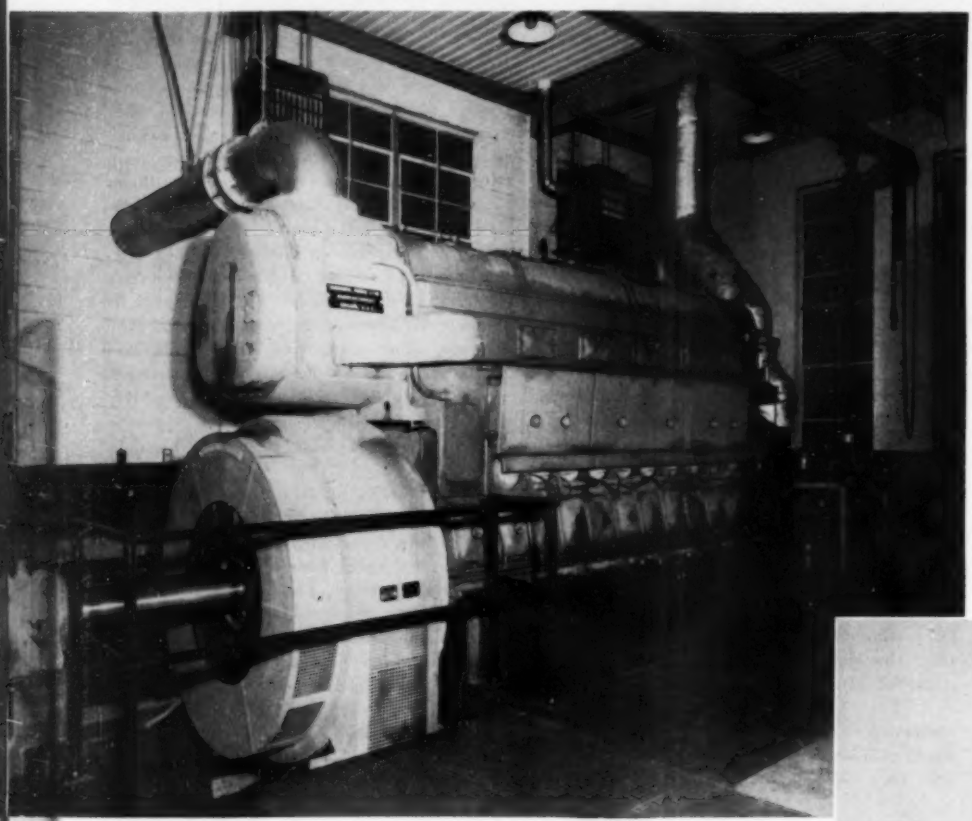
DIESELS play an important part in the operations of the Western Light & Telephone Company which provides electricity to more than 48,000 customers in Kansas and Missouri. This utility company, third largest in the state of Kansas, has experienced a steady and impressive growth in generating capacity and production. As recently as 1943, total generation was 69,853,000 kwh. In 1951, the system produced 210,514,401 kwh.

Diesels have contributed to this expansion. In 1943, total generating capacity was 27,500 kw., of which 10,050 was internal combustion. Last year, the system's capacity was 50,271 kw., of which diesel and dual-fuel engines accounted for 22,421 kw. This balanced growth reflects company policy of blending central station economy with the service advantages of decentralized generating facilities. The objective is to insure economical, dependable, high quality service to all consumers. To achieve this objective, the internal combustion units not only guard against service interruptions caused by high-line failures but carry a sizable portion of the load day after day. In 1951, these engines generated 62,824,707 kwh. of the total net generation of 198,722,953 kwh.

The Plainville, Kansas, station provides a good illustration of the part diesels play in the big system. Here, a 1600 hp. Fairbanks-Morse opposed-piston diesel was installed in July, 1948. In the three and a half years to the end of 1951, this single unit operated 16,999 hours and generated a net total of 14,403,954 kwh. Fuel consumption for the 42 months was 1,117,267 gal., an average of 12.89 net kwh. per gal. of fuel.

Citizens of Plainville have looked to this plant and its predecessors for electricity ever since 1905 when a 100 hp. steam engine was installed to run a flour mill and provide a little lighting for the village. The utility's present district manager, V. A. Perkins, went to work in the plant in 1906 and participated in every step forward: the switch from single-phase to three-phase, 60-cycle current in 1911; installation of the first internal combustion engine, a 200 hp., horizontal oil engine, in 1914; the acquisition of two 200 hp. Fairbanks-Morse semi-diesels in 1917; transfer of ownership to a power company in 1924; and finally, the construction of a new plant and installation of the 1600 hp. opposed-piston diesel in 1948. It should be noted that the original Fairbanks-Morse engines, after 35 years, still are available for standby service. Mr. Perkins was plant superintendent from 1908 to 1925 and has been district manager since that time. Through the years, the plant not only increased its service to Plainville, but steadily extended its area of operations. Zurich, Palco, Tacona, Codell, Paradise, Wlado, Luray, Woodston and Damar were tied into the expanding system. Today, of course, the Plainville station is linked to the company's big generating system which utilizes its gas-burning prime movers as much as possible to take advantage of the advantageous price of natural gas. The figures cited above indicate, however, that the oil-burning engines see plenty of service. They are essential in carrying the peak loads, in satisfying the rapidly expanding demand for power. They keep voltage steady and insure continuance.

The Plainville plant normally feeds its share of power to the high line but, if necessary, can operate as a wholly self-sufficient plant, satisfying the requirements of its home community and surrounding area. The compact new plant, fronting



This 10-cylinder, Model 38D 8 Fairbanks-Morse opposed-piston diesel develops 1600 hp. at 720 rpm. It drives directly an 1136-kw. F-M alternator with 15-kw. direct-connected exciter.

Western Light and Telephone's new Plainville, Kansas, plant was built in 1948 to house a 1600-hp. Fairbanks-Morse diesel. Seen here are the twin Vortox air filter-silencers and, at left, the induced draft cooling tower.

on Plainville's main street, is designed for efficiency and easy operating. Accessory equipment is complete, affording maximum protection to the prime mover. Automatic controls are utilized where practicable. The old engines were left in the old plant, some 20 yards back from the street, and the new building houses only the Model 38D8¼ Fairbanks-Morse diesel, a 10-cylinder, opposed-piston engine with 8⅛-in. bore and 10½ in. stroke, developing its 1600 hp. at 720 rpm.

The prime mover is a compact, heavy-duty engine, occupying little floor space for the horsepower it produces. The engine drives a 1,136 kw. alternator with 15 kw. direct-connected exciter. Soft cooling water is circulated through the engine jackets and through a heat exchanger by a centrifugal pump gear driven off the engine. A pair of motor-driven centrifugal pumps put raw water through the exchanger and a two-cell, induced-draft cooling tower. An automatic thermostatic control keeps the jacket water at prescribed temperature. The water is analyzed daily and makeup is treated with chemicals to reduce hardness.

Lubricating oil is pumped by an engine-driven pump from the engine sump to lubricate all the bearings and to cool the pistons. Some oil is bypassed continuously from this pressure system through a five-unit filter with cellulose cartridges. In the full-flow circuit is a shell-and-tube oil cooler with an automatic thermostatic control to regulate lube temperature. The plant also has a motor-driven auxiliary lube pump, used in starting and stopping the engine. Scavenging air for the two-cycle diesel is drawn from outside the building through a pair of filter-silencers of the oil-bath type. The air reaches the engine through a single header and is supplied to the cylinders by a built-in scavenging blower. The dual exhaust headers are joined outside the engine and vent through a single exhaust silencer on the plant roof. Starting air for the diesel is supplied by a motor-driven compressor with automatic pressure control. The plant has a 35,000 gal. underground storage tank to permit quantity purchases of fuel oil for whatever price advantage can be gained. The oil is unloaded by gravity and is pumped as needed through a meter to a 1,048 gal. day tank, then through cartridge-type filters to the diesel engine. Like the other equipment in the plant, instruments are complete and compactly arranged. A single gauge panel holds an exhaust pyrometer and gauges on jacket water temperature, raw water pressure, fuel pressure before and after the filter, lube pressure before and after the filter, and lube pressure at the engine. There are alarms on jacket temperature, raw water pressure, lube temperature and lube pressure. The switchboard has four panels and a swinging synchroscope panel and holds ammeters, voltmeter, pf meter, hour meter, recording kw meters, totalizing kwh. meters, recording voltmeter, circuit breakers and overcurrent relays.

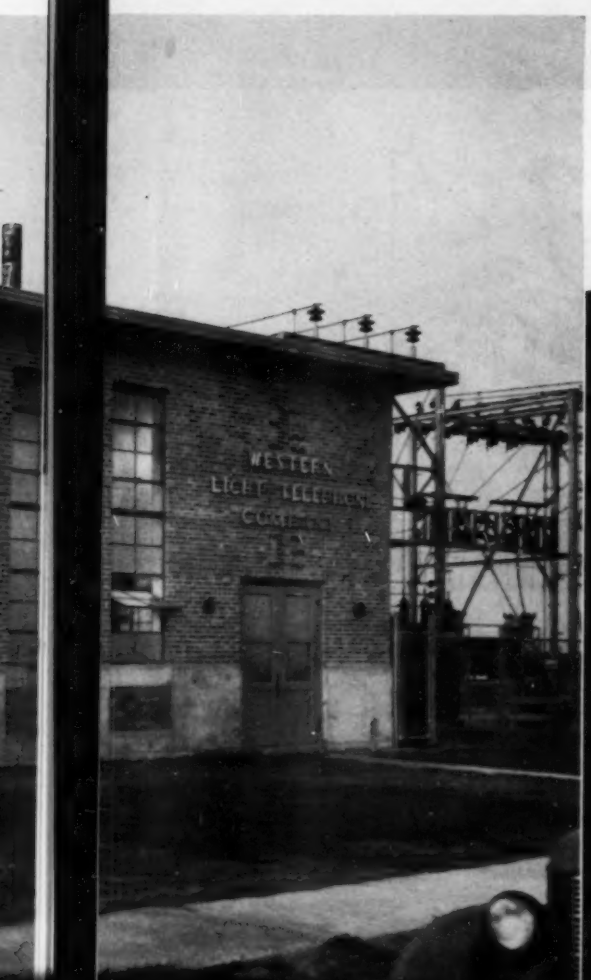
The Western Light & Telephone Company's activities extend into Kansas, Missouri, Iowa and Oklahoma, providing telephone, gas, water and electric service to varying numbers of consumers. The company is a Kansas corporation guided by a Board of Directors composed principally of Kansas businessmen. The principal administrative office is located in Kansas City, Kansas, where the Chairman of the Board, the President, the Secretary and the Treasurer have their headquarters. The chief field office is located at Great Bend, Kansas, where the Vice-President in charge of commercial activities and the vice-president in charge of operations maintain their offices.

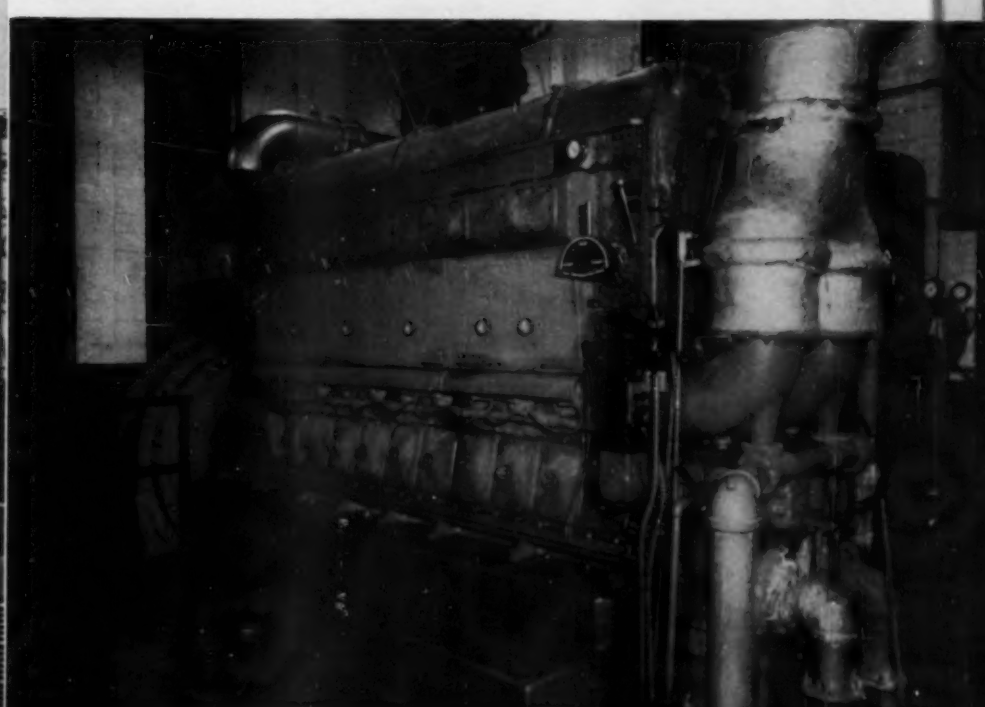
## List of Equipment

Engine—One 10-cylinder, 1600-hp., Model 38D8⅛, opposed-piston diesel operating at 720 r.p.m. Fairbanks, Morse & Co.
Alternator—One 1136 kw., 1563 kva., 3-phase, 60-cycle, 2400/4160 volt alternator with direct-connected 15-kw. exciter, Fairbanks, Morse.
Governor—Woodward Governor Co.
Fuel Oil—Socony Vacuum Oil Co.
Lube Oil—Vacme No. 3. Socony Vacuum Oil Co.
Lube Filter—Fairbanks, Morse & Co.
Auxiliary Lube Pump—Fairbanks, Morse & Co.
Oil Cooler—Ross Heater & Mfg. Co., Inc.
Water Pumps—Fairbanks, Morse & Co.
Heat Exchanger—Ross Heater & Mfg. Co., Inc.
Air Filters—Vortox Co.
Exhaust Silencers—Maxim Silencer Co.
Air Compressor—Fairbanks, Morse & Co.
Switchgear—Westinghouse Electric.
Pyrometer—Alnor. Illinois Testing Labs.

**TABLE I**
**1951 Operating Record 1600-Hp. Diesel, Plainville**

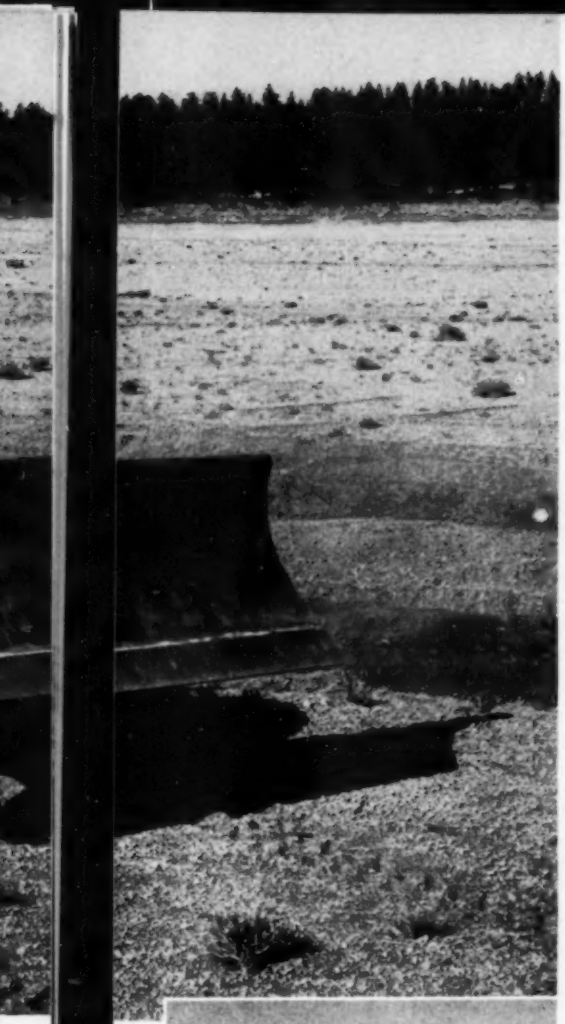
| 1951 | Net. Kw.-Hr. Generated | Fuel Oil Consumed gal. | Lube Oil Consumed gal. | Engine Hours Operated | Kw. Hrs. per gal. fuel |
|---|---|---|---|---|---|
| Jan. | 346,700 | 28,851 | 263 | 409.0 | 12.0 |
| Feb. | 347,958 | 25,575 | 222 | 396.5 | 13.6 |
| Mar. | 351,600 | 27,919 | 308 | 427.8 | 12.6 |
| Apr. | 319,300 | 25,100 | 284 | 388.5 | 12.7 |
| May | 333,000 | 26,927 | 323 | 408.7 | 12.4 |
| June | 311,800 | 25,298 | 306 | 401.5 | 12.3 |
| July | 390,333 | 31,332 | 354 | 420.3 | 12.4 |
| Aug. | 378,363 | 30,223 | 350 | 436.5 | 12.5 |
| Sept. | 317,500 | 25,453 | 265 | 387.9 | 12.5 |
| Oct. | 375,500 | 29,177 | 350 | 423.5 | 12.8 |
| Nov. | 356,600 | 28,017 | 298 | 400.4 | 12.8 |
| Dec. | 397,900 | 30,512 | 297 | 416.7 | 13.3 |
| Total | 4,226,554 | 334,384 | 3,620 | 4,917.3 | 12.64 |



Weighing 5,000 pounds less than larger, heavy-duty commercial graders, the Navy's new-type ,lightweight Austin-Western CB-88 grader is equipped with a 12-foot dozer blade. The CB-88 underwent exhaustive tests on San Nicolas Island near the Navy's Civil Engineering Research and Evaluation Laboratory at Port Hueneme, California. Results of the tests, in which the CB-88 competed with three other leading power graders of similar type, showed that the CB-88 developed 45 per cent greater tractive effort on 20 per cent less horsepower than conventional tandem drive graders.

Power on wheels best describes the Navy's new, lightweight diesel grader that develops 45 per cent greater tractive effort on 20 per cent less horsepower than conventional tandem drive graders. The grader, an Austin-Western CB-88 grader powered by an 80 hp., GM-3 cylinder, 1800 rpm. diesel engine, was developed and built by the Navy for use in forward areas where the terrain may vary from stable ground to soft mud and sand, and where roads are winding and precipitous.



# Navy Develops New Grader

*By* CHARLES DeSPAIN and
RICHARD LaCOSTE

A NEW lightweight, diesel grader that develops greater tractive effort with less horsepower than larger, heavy-duty commercial graders, has been developed by the Navy. Weighing 5,000 pounds less than the larger, heavy-duty commercial graders, the Navy's new Austin-Western CB-88 develops 45 per cent greater tractive effort with 20 per cent less horsepower and two tons less weight than conventional tandem drive graders.

The new grader was developed by the Navy for use in forward areas where the terrain may vary from hard ground to soft mud and sand; and where roads are likely to be steep and winding. A departure from conventional power grader construction, the CB-88 was built and developed to the Navy's Bureau of Yards and Docks specifications especially for air transportation. In exhaustive tests conducted on San Nicolas Island off the coast of California, the radically new power grader competed with three other leading power graders of similar type. These tests consisted of heavy and fine grading, heavy ditching and scarifying, dozing and banksloping. Other tests were conducted on the mainland.

After 596 hours of operation, test results showed that the CB-88, powered by an 80-horsepower, GM-3 cylinder, 1800-rpm. diesel engine with a G-wheel drive and steer, could outmaneuver the other graders in smaller areas, and was capable of going through mud and sand where the others had bogged down. It negotiated steeper slopes and sidehill grades. The operator was able to swing the moldboard into banksloping position without assistance. In addition, the CB-88 proved its superiority in drawbar pull, tractive coefficient, turning radius in sand, and maximum slopes negotiated. The tests were conducted on a roadway surveyed from the top of the island plateau, 907 feet above sea level, down to the beach. This roadway, 8,200 feet long, wound over rugged and eroded mountain terrain, consisting of clay, rock, adobe, light and heavy shale, sandstone and limestone. Sheet and gulley erosion had formed many small washouts ranging from two to four feet wide and three to five feet deep. The average grade of the roadway was 11 per cent; the steepest, 42 per cent. The tests were conducted by the Navy's Civil Engineering Research and Evaluation Laboratory of Port Hueneme, California.

Weight of the CB-88 is 17,025 pounds, which is approximately 5,000 pounds less than the larger, heavy-duty commercial graders. Weight does not include the attachments or the calcium chloride solution in tires, as recommended for advanced base use. Gross weight of the CB-88 with all attachments, calcium chloride solution in tires, front axle power divider, independent mechanism for operation of the dozer and sacrificer, and frame reinforcing gusset plates, is only 22,373 pounds. Other dimensions of the CB-88 are: length—25 feet (without the dozer); height—six feet, 10½ inches; width—seven feet, 10½ inches. Dozer blade is 12 feet wide with a one-foot extension on either side.

# G. W. CODRINGTON

THE 143-foot ocean-going G.M. diesel-electric powered tug, *G. W. Codrington*, is an outstanding example of the kind of service which means so much in low annual upkeep, greater towing power and higher annual mileage. The proof of this statement was a recent towing job of the 620-foot ore carrier *Cliffs Victory* from Baltimore, Maryand to New Orleans, Louisiana. The trip, with the large vessel at the end of a 2-inch steel-wire rope, covered 1,649 sea miles and was completed in 16 days. It was an excellent accomplishment for one tug and proved that complete faith could be placed in the reliability of her diesel-electric propulsion machinery.

The *G. W. Codrington* was operated on this trip by the Moran Towing and Transportation Company of New York City. She left Baltimore with her tow at 11:30 a.m. on Monday, April 2, and proceeded down Chesapeake Bay and past the Virginia Cape. The draft of the tow was 16 feet. The 150-mile run to Cape Henry from Baltimore was made by 4:00 p.m., April 3, under moderate weather conditions with a northwest wind. Cape Hatteras, some 120 miles further on, was reached at 2:40 p.m. the following day. Wind was then on the beam, and a strong current had to be bucked along the edge of the Gulf Stream. By 9:00 a.m., April 11, the tug and her tow were off the beginning of the Florida Keys. In the Gulf of Mexico, fine weather was met for one day, then a strong northerly breeze arose from the starboard beam. On April 16, they ran into a full northerly gale 100 miles from the Southwest Pass of the Mississippi Delta. For a time, no headway was made, but despite the wind and heavy seas, the tug held onto her tow.

The Pass was reached at 7:00 a.m., April 17, the average speed for the entire run being 4.7 knots. *Cliffs Victory* had offered far greater resistance to towing than would an average ship of her size because, in order to lighten the hull to an eight-foot draft, special steel pontoons had been welded to the stern at the waterline on either side. Attached to these pontoons below the waterline were six protruding structural steel frames, which fact was unknown to the tug's skipper until they became exposed when pumping started on the *Cliffs Victory* in New Orleans to lighten her for the long haul up-stream to Chicago. These frames were for lashing the river towboats alongside, and they offered considerable drag, thus lowering the towing speed at sea. Hence, the *G. W. Codrington* had been doing a far more effective job than had been realized. Fuel consumption of this diesel-electric tug was so moderate that when she arrived at New Orleans, she had a notable amount left in her bunkers, and, from it, was able to transfer 2,500 gallons to the *Cliffs Victory* for heating, lighting, cooking and domestic pumping purposes.

The *G. W. Codrington's* bunker capacity is 52,200 gal., which gives her about a 30-days' supply under average towing conditions. The fuel tanks are forward of the engine room. This large cruising radius saves time in bunkering, and adds to the over-all operating economy. The fact that she was able to refuel the *Cliffs Victory* made it unnecessary to send for an oil-tank barge to come alongside the big ore carrier. When the *G. W. Codrington* docked in New Orleans, the entire vessel and her machinery were spotless—everything above and below was spic and span. No overhaul of the machinery was needed and the tug left the next morning for Jacksonville, where she picked up a tow for New York.

The *G. W. Codrington* is 143-feet over-all; molded beam 33 feet; depth amidships 17 feet; mean draft 9 feet. Designed by Tams, Inc., of New York City, and built by the Levingston Shipbuilding Company in Orange, Texas, the vessel is of all welded steel construction and is propelled by two General Motors Model 12-278A two-cycle diesel engines with electrical transmission units to the propellers.

Big and powerful, with excellent sea-worthy qualities, she is equipped to go anywhere from the Tropics to Alaska under own power. Her two General Motors diesels for main propulsion power have twelve cylinders each and drive two 605-kw., 560-volt, dc. generators at 750 rpm. Each of these diesels has a rating of 925 bhp. and the generators have direct-connected, 24-kw., 125-volt exciters and generator cut-out switch cabinets, including engine starting switches. Turning the propeller shaft are two 765 bhp., 560-volt, dc. electric-propulsion motors, each designed to rotate at 700/875 rpm. The propulsion motors are direct-connected to a reduction gear driving the propeller shaft at 160/200 rpm. at full speed. The reduction gear is of the two-pinion, double-helical, single-reduction type, with individual propeller thrust bearing and shaft coupling.

Although the main and auxiliary diesels represent a total of nearly 2,000 maximum horsepower, there is ample room for the engineers to move about freely. For auxiliary power, there are two General Motors Model 6-71 diesel generator sets, each having six cylinders and rated 90 bhp. at 1200 rpm. Each auxiliary generator is rated 60 kw., 120 volts, and is connected to its driving engine by a flexible coupling. When feeding the ship's service bus, these generators meet the voltage requirements for this service and parallel satisfactorily without equalizers. To charge the ship's storage batteries, they are adjustable by means of rheostatic control at a peak no-load voltage of 142 volts. When separately excited from the ship's service bus and feeding the automatic towing engine through the differential series field, each generator has voltage characteristics as required for satisfactory operation and has sufficient capacity to supply peak loads demanded by the towing engine. The pilot house contains the engine controls, enabling the navigator to maneuver the tug without signalling down to the engineer on watch. A gyro compass and direction finder also are part of the pilot house equipment. The captain's cabin is on the boat deck and contains a berth, settee, arm chair, wardrobe, bureau, radio table and ship-to-shore telephone with remote control. Directly aft of this space is another stateroom containing two single berths, with toilet and adjacent shower, shared by the captain.

On the main deck below are the chief mate's and chief engineer's cabins, to the port and starboard respectively, and located at the forward end of the superstructure. Next, on the starboard side, is a cabin shared by the second and third mates, followed by a cabin for the two assistant engineers. Across the alleyway from these cabins are the wireless operator's cabin and the officers' toilet. Next comes the combination galley and mess room, followed by a compartment containing two refrigerators, ice machine and hatch to the engine room.

The towing machine and towing bits are on the deck to the rear of the superstructure. Forward of the deck house is the anchor windlass and a hatch to the forecastle below. In the forecastle are berths for four men, two toilets and a washroom, also a shower with adjoining change room. Aft of these accommodations are two cabins on the port and starboard sides respectively, each having berths for three men, also lockers and folding desk tables.

There is a complete electric alarm system with six-inch bells located in various parts of the ship, and with push buttons in the pilot house and other places. The *G. W. Codrington* is well equipped from stem to stern, in keeping with the needs of long hauls in ocean service. In competition on the high seas and in harbors, she can hold her own with any tug of equal size.

G.W.CODRINGTON

# NEW ENGINE BY PETERSEN

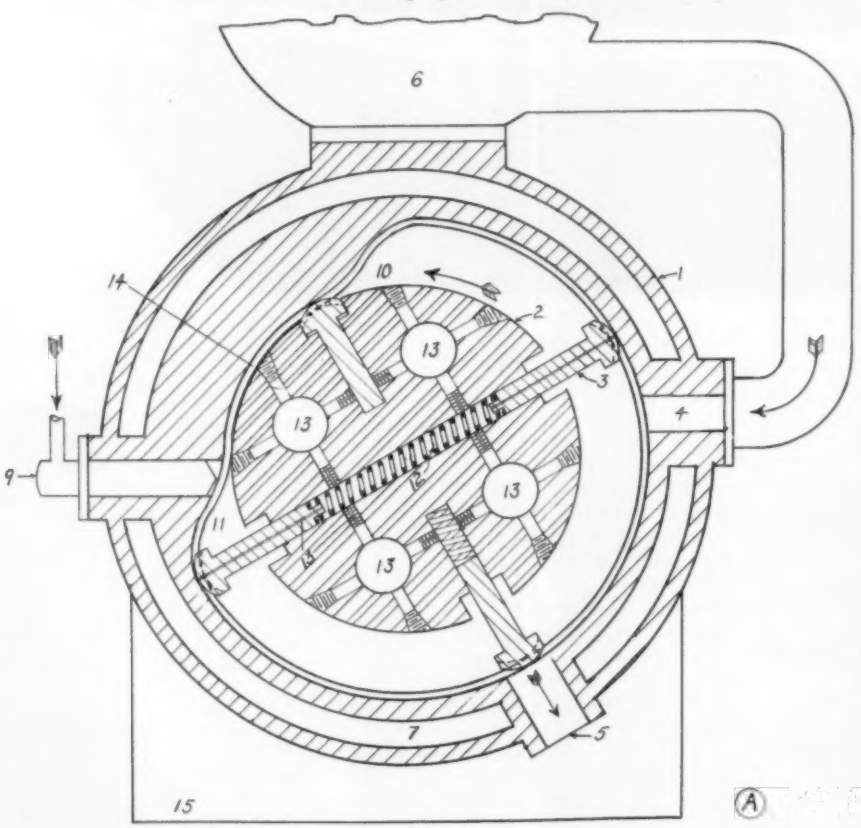
H. M. PETERSEN, Consulting Engineer, San Francisco, reports the successful completion of tests on a new rotary internal combustion engine. This engine, without valves, pistons or crank shaft and with only five moving parts subject to heat, is believed to be revolutionary in both gasoline engine and diesel fields. It is intended for use in automobiles, trucks, locomotives, ships, submarines and stationary power plants.

The principle upon which this engine is based—using sliding vanes inside a housing—is not a new one. It has been used and is being used in oil pumps and compressors. Previous attempts to use this principle in the design of a four-cycle engine which provided its own suction have almost invariably been unsuccessful as not enough compression could be obtained and not enough useful power. In such designs, the rotor was placed *eccentrically* in the housing. Also, in most versions, vanes were moving during both expansion and compression. In the Petersen engine, the rotor runs *concentrically* in the housing. This was made possible by use of an attached or independent blower to introduce air, eliminating the necessity of creating its own suction. But the significant feature of the design, according to its inventors, lies in the unique shape of the inner surface of the housing which forms pre-compression and combustion chambers. Air, introduced by the blower, starts to compress when the vane enters the contour. At that point, fuel is injected. The mixture is then forced, at high velocity, through the venturi-like channel between rotor and housing. When the vane leaves the contour and presents its full area, ignition occurs, driving the rotor in the desired direction. When ignition takes place, the following vane is almost wholly within the rotor, presenting very little area for back pressure. It stays in that position almost to the end of expansion and the beginning of exhaust. Four power impulses occur at each revolution of the rotor, therefore, for practical purposes, the engine should be considered as a two-cycle, four-cylinder engine.

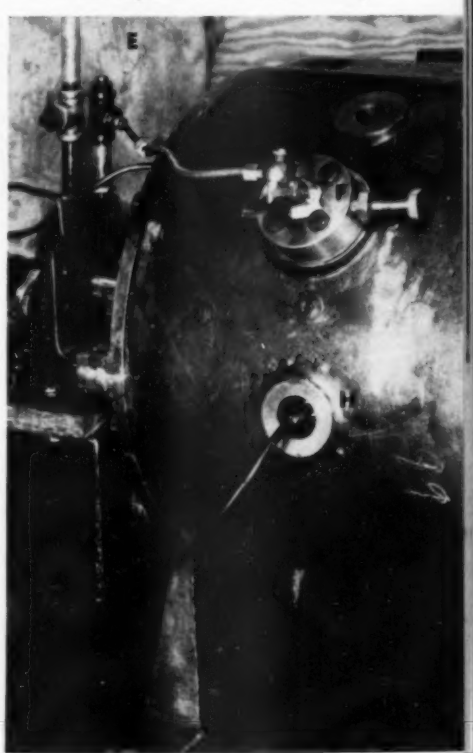
The vanes are made in two pieces, dove-tailed together and held tightly against the end pieces with three springs. The shape of the vanes is a patented feature of the Petersen design. These are shaped in such a way that, when entering the contour, the leading edge is always in contact. On the circular part, the center of the blade is in contact. When the vane leaves the contour, the trailing edge is in contact. This results in even wear on both blades and housing and provides a perfect seal at all times. It should be noted that the leading edge of the blade builds up a wedge of lubricating oil—somewhat like a Kingsbury thrust bearing—and prevents direct metal to metal contact. This test engine has been run for 1500 hours and there is no perceptible wear. The lubricating system is self-contained. It lubricates both vanes and housing and cools the rotor by means of drilled oil passages. The housing is cooled by water. Cooling jacket may be of sheet steel or cast integrally with the housing. Overall dimensions of the test engine, which develops 170 hp., are: length 28½ in.; height 25 in.; width 20½ in. Weight averages about 3.2 lbs. per hp. The experimental engine, with 7.5 to 1 compression ratio, was designed to run on gasoline but tests showed that it would also run on kerosene and light diesel fuel due to its unusual pre-compression and combustion chambers. The engine requires virtually no critical materials. The housing is of close-grained cast iron; the rotor of mild commercial steel; the vanes of "Meonite."

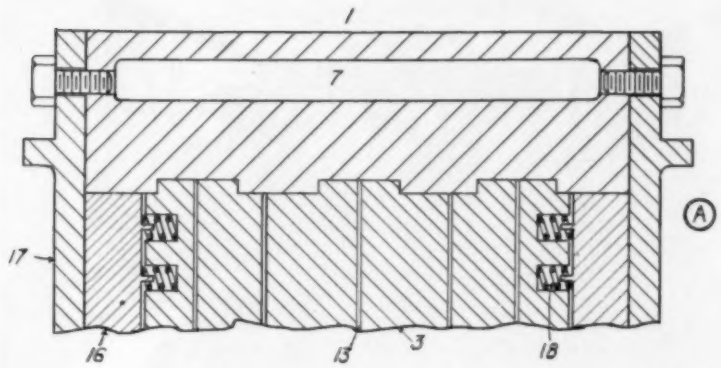
Test reports indicate that the engine has come up to all performance standards, as to fuel consumption, torque or power, contemplated in its design. Ability to stand up under excessive conditions of heat and pressure were also demonstrated. The gasoline engine and the diesel engine are both based on the same fundamental principles and the same patents. The diesel engine, however, while it has the same contour, has a very close clearance between the rotor and contour and the venturi-channels are machined into the housing, therefore the blade construction in the diesel is different and

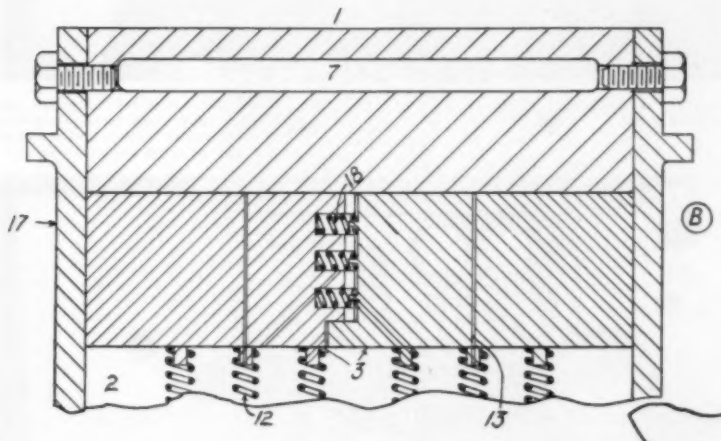
**The diesel engine: 1—housing. 2—rotor. 3—sliding vanes. 4—scavenging ports. 5—exhaust 6—scavenging blower. 7—cooling water jacket. 9—fuel injector. 10—precombustion chamber. 11—combustion chamber. 12—vane actuating springs. 13—lubrication system. 14—venturi-channels. 15—base. 16—compression sealing pieces. 17—end plates. 18—compression seal springs.**




**The new Petersen engine. A—the housing. B—rotor shaft flange. C—scavenging blower drive. D—scavenging blower. E—fuel pump. F—fuel injector. G—end cover.**





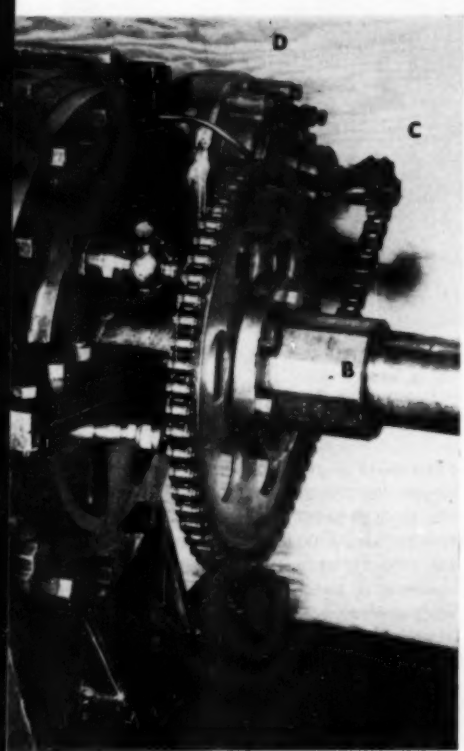



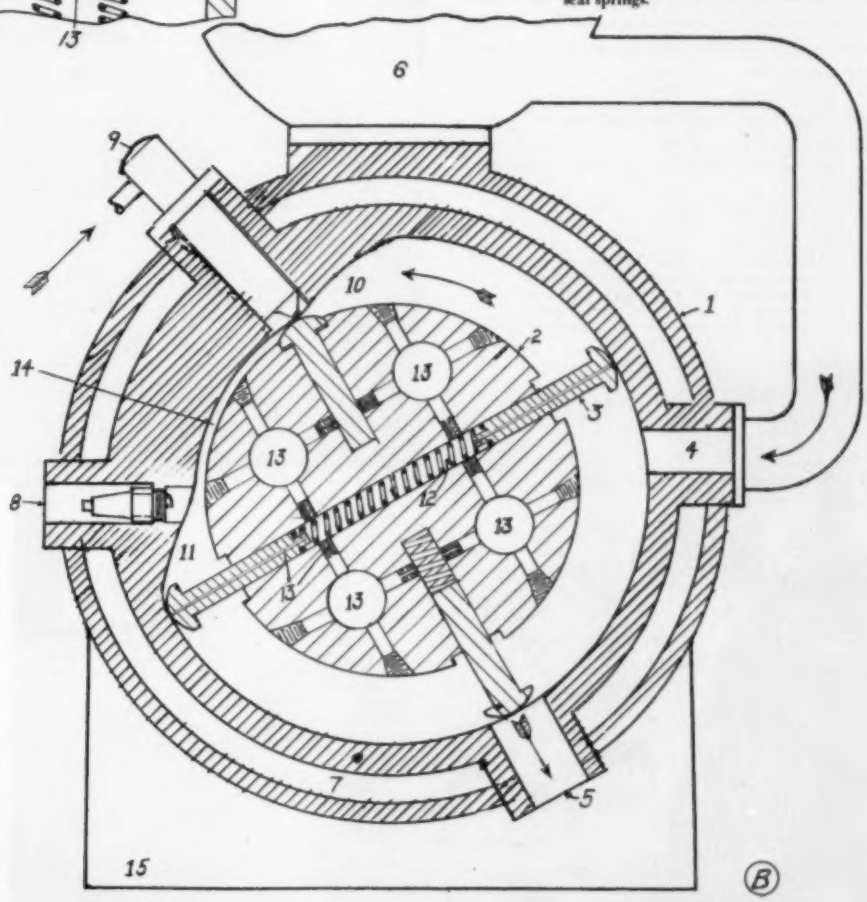

the sealing effect against end covers is done by separate sealing pieces as shown. This design permits compression ratio of about fourteen to one. In the diesel engine the fuel is injected directly into the combustion chamber.

The experimental engine was built and tested in San Francisco. Mr. Petersen states that he intends to offer the manufacturing rights to these engines under both national and international patents to interested firms. He can be reached at 2647 Buchanan Street, San Francisco 15, California.

EDITOR'S NOTE: H. M. Petersen has been long and favorably known throughout the Diesel Industry. A graduate of the Polytechnic Institute of Copenhagen, Denmark, he came to this country in the late twenties and is probably best known for the work he did for Hooven, Owens Rentschler Division of what is now the Baldwin-Lima-Hamilton Company. He was guarantee engineer for the installation of five 7500 hp. Hamilton-M.A.N. engines at Vernon, Calif. in 1932-1933, followed by six Hamilton-M.A.N. units at Brawley and two 7500 hp. units at Tempe, Ariz. He has been a Consultant on diesel engine design and operation for the past ten years. We have seen his new engine and it runs.

**The gasoline engine: 1—housing. 2—rotor. 3—sliding vanes. 4—scavenging ports. 5—exhaust ports. 6—scavenging blower. 7—cooling water jacket. 8—spark plug. 9—fuel injector. 10—pre-combustion chamber. 11—combustion chamber. 12—vane actuating springs. 13—lubrication system. 14—venturi channel. 15—base. 17—end plates. 18—compression seal springs.**



# SUPER DIESEL INSTRUCTION CAR

*By* CHARLES F. A. MANN

WHILE many segments of the U. S. diesel and railroad industry are expressing growing interest in the future of freight motive power on the Illinois Central Railroad, perhaps all questions can neatly be answered by the announcement a couple of weeks ago of the first system wide tour of a brand new, deluxe diesel instruction car developed to instruct hundreds of I.C. motive power and mechanical people in proper handling and maintenance of all types of diesel locomotives. A conservative, engineering-minded railroad like the I.C. simply doesn't spend $100,000 on a gadget like this if they foresee a large immediate future for the gas-fired turbine-electric locomotive.

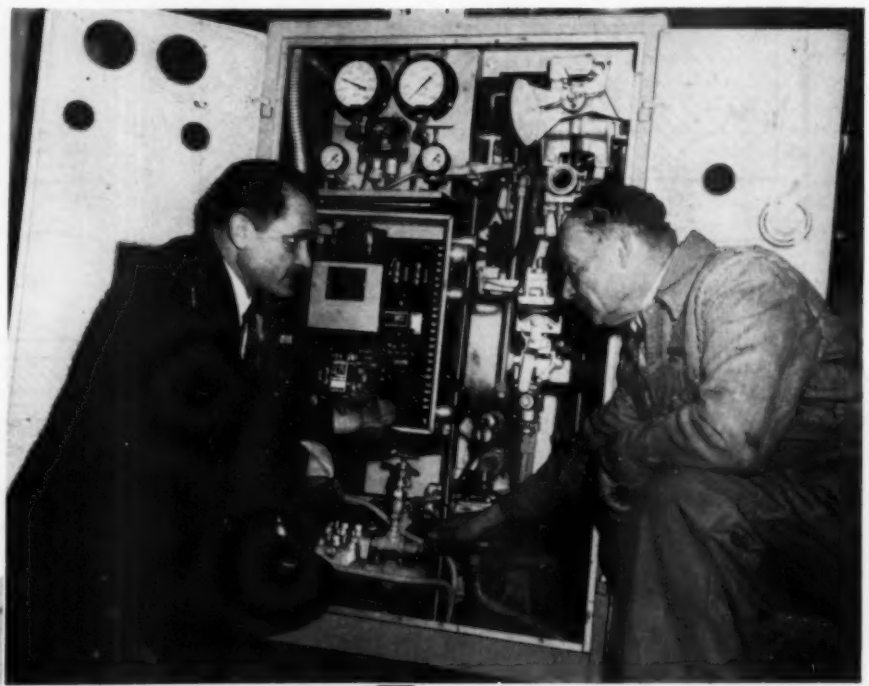
Designed as a rolling schoolhouse for all parts of the system, the new car was designed and constructed at the famed I.C. Burnside Shops at Chicago. Every instructional aid to make this a complete classroom on wheels was fitted, and the car designed to operate independently while parked out on the line.

A complete electro-motive diesel cab was reproduced as well as a full air brake and control panel system, together with a full cutaway section of an EMD diesel engine and full accessory end of a regular diesel. By throwing switches the instructor can duplicate practically any line operating condition and set the student to correcting and tracing the difficulty, whether it be mechanical or road operating in nature. Even wheels to simulate a truck wheel against a rail is duplicated. A full scale heating boiler layout is set up, which supplies heat for the car in its spare time.

An eighteen section classroom with movies, sound equipment, slide space, literature cabinets and in-

Control end of diesel boiler, built by Vapor Car Heating Co.

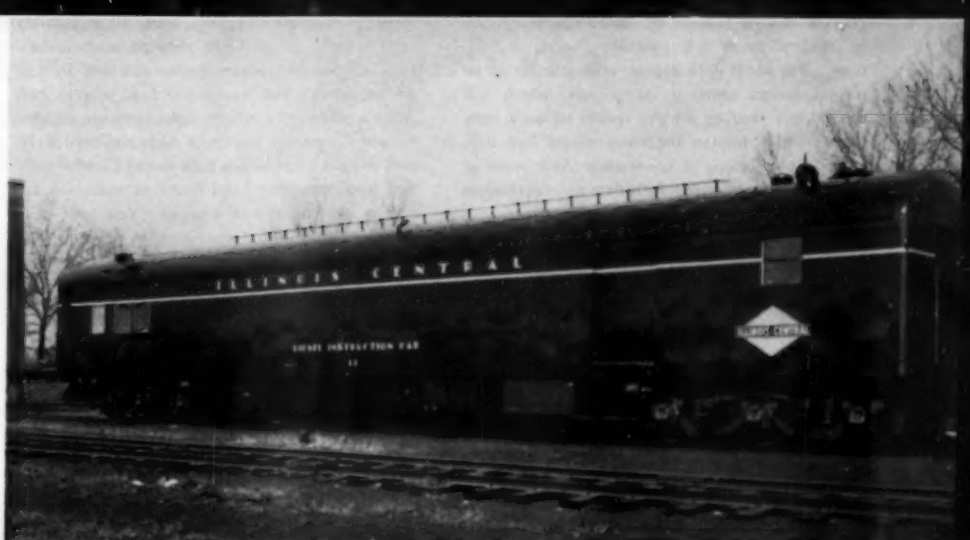
Illinois Central diesel instruction car showing boiler room (center) cutaway of diesel engine (right) and accessory end of diesel engine (left).



Illinois Central R.R. locomotive engineer receives instructions on diesel operation from R. I. Fort, diesel instructor as A. G. Kann (background) general superintendent of equipment, looks on.

Over-all view of Illinois Central diesel instruction car.

Diesel instruction car showing switch control panel behind diesel cab controls from which instructor can duplicate conditions encountered in road operation.




Exterior of the Illinois Central diesel instruction car.

struction manual, right down to a duplicate of a wayside telephone plug-in. Variable voltage current is supplied by a power generator under the car. The car is fully air conditioned and fluorescent lighted, and equipped like a model classroom.

Responsible for the car and the training program is Albert G. Kann, general superintendent of equipment of the Illinois Central, and his aide, John A. Welch. Robert I. Fort is traveling instructor. Living quarters for two are provided also, as well as private office for the instructor.

# Supervising & Operating Engineers Section

CONDUCTED BY R. L. GREGORY

## A Few Comments and Conclusions

DURING the past three months your writer has had the privilege of publishing a series of artices covering a paper by Mr. J. Bryan Sims, Suprintendent of the Board of Public Works, of Grand Haven, Michigan. This paper was presented before the Michigan Municipal League at its fall meeting, and was entitled "Maintenance of Large Slow Speed Diesel Units." It was very well presented and from the many comments heard from diesel men much valuable information was gleaned from the comparisons and data as Mr. Sims presented it.

Since one of the functions of these articles is to stimulate discussions on the various problems presented to our readers, we do feel that it might be well to add some additional comments on the foregoing series while they are fresh in the minds of our readers, and especially in view of the fact that Mr. Sims stated, that since many of the tests made, especially on comparisons of lubricating oils had not been concluded, hence the facts as presented in his paper at the time were not exactly conclusive. It is your writer's understanding that Mr. Sims is continuing these tests, trying to arrive ultimately at some very definite conclusions as to the effects of different types of lubricants on maintenance costs, and we do sincerely hope that when he has completed his tests he will be able to give us some facts which will definitely be a basis for his conclusions. Now to the writer, Mr. Sims has taken upon himself not only a very interesting study and experiment with lubricants, but also one fraught with several difficulties.

Knowing his regard for thoroughness in all matters which he undertakes, we are sure that Mr. Sims has taken into consideration, that in order to arrive at any positive conclusions relative to his tests on lubricating oils and their effect on maintenance costs, all conditions during the periods of such tests as he conducted, should be as nearly alike as it is humanly possible to have them. But there does appear to the writer to be certain factors entering the picture, which will have direct bearing on the results of such tests, factors which human ingenuity would find difficulty in overcoming or combating. As a result of these factors your writer feels that any conclusions arrived at will only approach somewhere near a positive status. Now perhaps I am being a little pessimistic when I make this statement, since perhaps he is only striving to arrive at generalities in the matter of the effect of lubricants on maintenance costs, and not trying to find a Utopia. To enumerate some of these factors or conditions which form the basis for your writer's conclusions (and these conclusions could be erroneous since they are merely one engineer's opinion) at the same time they seem to be logical factors which could in the overall picture, disrupt such tests. Some of these factors are as follows:

*First:* There is the matter of metallurgical content and construction of both liners and rings, the two wearing parts, possibly most effected in daily operation. With all due respect to all Diesel Manufacturers, and knowing the amount of study, effort and money expended in design, the study of metals and metallurgy with respect to uniformity of product and construction, and the reaction of this product to wear and tear, it does seem that somewhere along the line they have failed to come up with the right answer. Now I may be severely criticized for such a statement by some engineers, but I have drawn my conclusions from years of experience with liners and rings. Years ago, while discussing diesel and diesel design with a group of diesel engineers, I made the statement that the diesel engine was in its infancy and like radio, many improvements of a startling nature could yet be expected. I was taken thoroughly to task for that statement and told that the diesel engine, particularly the large slow speed types had reached the point where any further development would be money wasted since it was then at the point of maximum efficiency. But the past decade has proven this to be untrue at the time.

We, as many of you possibly have, have overhauled units and in so doing have equipped them with a complete set of new liners, each piston has been refitted with duplicate sets of rings made by the same manufacturer. You have taken every precaution to get accurate records and readings of the liners and rings before putting the unit into operation. Then the units have been placed in operation, and close records have been kept of lubricants used, of the fuel injection equipment, of daily rack settings, cards taken possibly each week to record firing pressures and combustion, the cooling water system watched, in fact all operating conditions noted from day to day. After a period of several months you have decided to pull the pistons and check rings and liner wear, and to your surprise you have found that the average liner wear per 1,000 hours of operation has varied, one liner with another. You have reassembled the unit and continued to operate it for several months more, trying to keep conditions as nearly uniform as possible from day to day. Then you have dismantled the unit again and checked on liner and ring wear and found a repetition of what you found before, a variation between that wear in respect of one liner to another.

To the writer, there is only one basic conclusion that can be drawn when such conditions are found. Theoretically the wear of one liner as against another, taking all operating conditions into consideration, such as lubrication, fuel injection systems, cooling, load division between the various cylinders, etc., this wear should be very nearly uniform, but in practice such does not prove to be the case. Hence somewhere along the line, some condition exists which causes one liner to wear more than another. Such a condition or factor may be caused by one of many things or a combination of things, and the chances are ninety-nine to one, that the condition or combination of conditions causing this difference in liner wear in the same unit, is one that no amount of lubrication, or type of lubricant will correct, providing sensible lubrication practices are followed at all times.

The question then arises as to what is this factor or combination of conditions that is causing this difference in liner wear? The answer is that these causes are legion, and as a result who can say whether it is due to one certain type of lubricant, or an inherent characteristic of certain integral mechanisms in the makeup of the unit and its parts, or just what the cause might be. Of course we know that some lubricants do a better job on certain types of units than other will, but one thing is certain, that regardless of whether you use a straight mineral type of oil, or an additive type, or some other combination of lubricants, you are going to have more conclusive results, by running such tests with the same type of lubricants in all cylinders. To the writer it would seem more feasible to make a comparison of lubricating oils, one with another, by lubricating all cylinders with one oil and then changing oils for the next comparative test.

To take a group of three cylinders of a unit and lubricate them with a certain type of oil, another group of three and lubricate them with a still different oil, and base your conclusions as to which is the best lubricant from the wear results of the test, does not seem to the writer at least, to give you an authentic comparison. Somewhere along the line there may be a condition which varies between these groups of liners, a condition that has an ultimate effect on lubrication, it may be a mechanical condition, a metallurgical composition, an operating situation or factor and consequently the comparison does not seem to be an accurate one.

*Secondly:* There is the factor of atomization and

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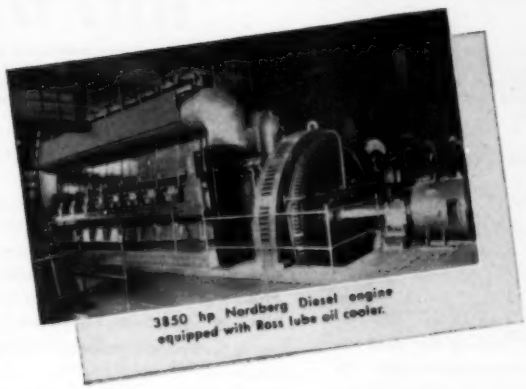
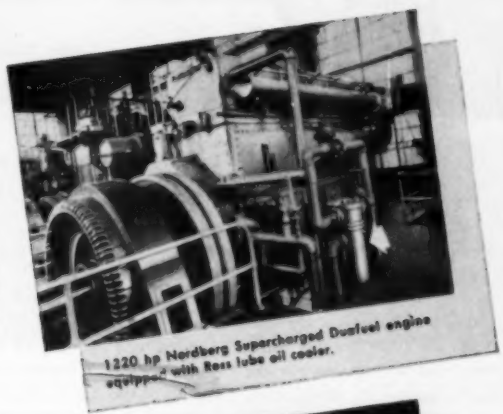
**again Ross Exchangers for**

# *temperature safety*

**in these Nordberg engine installations**



3850 hp Nordberg Diesel engine equipped with Ross lube oil cooler.



1220 hp Nordberg Supercharged Duafuel engine equipped with Ross lube oil cooler.

Three 1685 hp Nordberg Supercharged Duafuel engines equipped with Ross lube oil and jacket water coolers.

A vital part of the lube oil circuit in each of these Nordberg engines is a Ross Type CP Exchanger. On it, along with other key components, rest the critical responsibilities of adequate bearing lubrication and piston cooling.

Naturally, with a reputation for dependable, low cost, lasting service, Nordberg engines require components of like qualities . . . the very reasons Ross Exchangers are used so extensively.

Long experienced with the successful performance of Ross Exchangers in *all* types of municipal and industrial power applications, Nordberg Manufacturing Co., *knows* that lube oil and jacket water temperatures are in safe hands when Ross is selected . . . as do the plant engineers who operate these rugged Diesel, gas and Duafuel engines.

Among engine builders *everywhere*, there is a distinct preference for Ross Exchangers. On engines, compressors, turbines, speed increasers, reduction gears. In generating stations, oil fields, pipelines, locomotives, chemical plants and aboard ship. For, engine builders are continually looking to Ross for the ready answer. *And they always get it* . . . either in the form of a fully standardized unit available from stock, or one that is custom-assembled from stocked parts and sub-assemblies.

Literature is available to describe Ross standardization in detail. Ross Engineers are available to work out your problems with you. Write.

ROSS HEATER & MFG. CO., INC., Division of American Radiator & Standard Sanitary Corp., 1425 West Avenue, Buffalo 13, N. Y. In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

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AMERICAN STANDARD · AMERICAN BLOWER · ACME CABINETS · CHURCH SEATS · DETROIT LUBRICATOR · KEWANEE BOILERS · ROSS HEATER · TONAWANDA IRON

# WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **HAMISH FERGUSON**

**Hamish Ferguson was appointed secretary to the Diesel Engine Users Association in London in 1944. Previously senior technical assistant to Diesel and Insurance Consultants, London, and for several years with English Electric Company in the designing and erection of large diesel generating plants. Mr. Ferguson continues to do independent consulting work.**

## London Buses on Goodwill Tour of U.S.

THREE London Transport buses are now on a tour of the U.S. covering approximately 8,000 miles, and embracing 27 states. They will travel right across America, from the east coast to the west, and back again to New York by a different route. Various departments of the U.S. Government have rendered every possible assistance in planning the tour which also has the backing of the British embassy in Washington. The buses are of the same familiar red double-deck type in which thousands of Londoners travel daily. One of them is fitted out as a mobile exhibition and information bureau where specially-designed displays highlight Britain's tourist attractions. The second bus is a normal passenger vehicle. It will be used to give rides to residents in the towns where the convoy halts. The third vehicle will act as a crew-bus and mobile workshop.

The buses are of the latest type. They are, in every particular, the "genuine London article" with which many American visitors to Britain have been greatly impressed. A pilot car, supplied by the Austin Motor Co., will lead the convoy. Other vehicles taking part in the tour are a "Thames" half-ton generator truck supplied by the Ford Co. and a mobile servicing unit, provided by Leyland Motors, which will carry spares including two complete engine units. All the vehicles in the convoy are painted "London Bus red." The "RT" double-deck has been designed in collaboration between the engineers of London Transport and the Associated Equipment Company. The 120 horse power diesel is mounted flexibly on rubber to absorb vibration and the well known fluid flywheel transmission is used in conjuncture with a self-changing gearbox controlled by compressed air which also actuates the brakes and automatic oiling system.

The body, designed in conjunction with the chassis by London Transport, is almost entirely built of metal and is devoid of dirt and dust traps. The driver's cab is fully enclosed, having a sliding door, a new type daught-free floor, and a variety of ventilation controls. A new type of adjustable seat ensures the comfort of every driver. Seats, for 30 passengers in the upper saloon and 26 in the lower saloon, are metal framed but have spring fillings until such time as rubber can again be used. Wide safety-glass windows, many of them easily opened by winding handles, and a cleanly designed interior give an air of spaciousness within the vehicle. Two of the buses are fitted with 9.6 litre A.E.C. engines, the third having a Leyland engine of comparable output. Details of the A.E.C. chassis are as follows: 9.6 litre engine, fluid transmission, compressed air brakes. The engine is A.E.C. 9.6 litre, 6-cylinder, direct-injection, 120 mm. bore x 142 mm. stroke. Power developed, 125 bhp. at 1800 rpm. (sea level and normal temperature). Maximum torque, 430 lb. ft. Timing gear train of amply proportioned helical gears. Large capacity oil bath type air cleaner. The engine mounting is rubber mounting of A.E.C.–Metalastik "Floating Power" type. The fluid flywheel is of entirely new construction allowing maximum freedom at idling and minimum slip at working speeds. A pre-selective gearbox is compressed air operated. Four forward speeds and one reverse. Ratios: 1st speed, 4.50:1; 2nd speed, 2.53:1; 3rd speed, 1.64:1; 4th speed, 1:1; reverse, 6.9:1.

Change speed preselector; finger-tip mechanical control from steering wheel. Brakes, foot: compressed air to all four wheels. Hand: mechanically, to rear wheels only. Hand fitted with trailing double pawl. Drum sizes, front 15½ in. (394 mm.) diameter x 3⅝ in. (92 mm.) wide; rear: 15½ in. (394 mm.) diameter x 6½ in. (165 mm.) wide. Brake drums are secured to the outside of the hubs. Front axle; alternative units for 8 ft. 0 in. (2,438 mm.) or 7 ft. 6 in. (2,286 mm.) overall width.

*. . . and now please turn to page 68 . . .*

# PRESENTING THE DIESEL PROGRESS AWARD

Group picture of the award. Left to right: Wm. E. Rushlow, Head of Power Operation Section, REA; Howard Helmers, Manager of Graham Co-op; Walter Batty, President of Graham Co-op; Grover Windsor, Chief Operator of Graham Co-op; Rex W. Wadman; Milton Chase, Ass't Chief of Power Div., REA, in Washington.

MILWAUKEE, May 8th. Rex W. Wadman, Editor and Publisher, today, at the Third Annual REA Operators' Meeting, awarded the DIESEL PROGRESS award for the most efficiently operated of all REA internal combustion plants in the following words:

Nearly a year ago, a very bright idea was generated in Washington! It seems that one of the ex-bureaucrats down there was conspiring to put us individually and collectively to work—at least for my part I can say he succeeded. I will not attempt to give credit to nor pin the lily on the individual or individuals who worked out this plan for an annual award to the most efficiently operated of all REA internal combustion engine plants. But when Bob Craig, who is familiarly known around the REA offices as "Doc," approached me with the suggestion that DIESEL PROGRESS should become the sponsor of this annual award, I not only felt it was a good idea—I was in fact honored.

I realized that within this group of REA-financed plants there is a community of interest and singleness of purpose that makes possible the creation of a healthy competitive spirit. And, therefore, we had the basis of programs that could not possibly be implemented among the thousands of plants that do not enjoy this common bond. It is indeed a master stroke of progress to put a finely organized group of machinery together in a generating plant and bring its benefits to thousands of people, but it is quite another stroke of genius to get the utmost out of that plant through constant vigilance over the vast details of operation and maintenance. So I thought the mere sponsorship of a plan to bring about greater efficiency-consciousness within this fine group of plants was something well worth my time and attention. I told "Doc" Craig I would do it, and I am happy to be here today to name the winner of the first annual DIESEL PROGRESS award for most efficient plant operation.

We realized, at the outset, the almost innumerable factors that determine the final cost of putting current on the line, which, in the last analysis, is the measure of efficiency. In conference with REA officials in Washington, we weighed these factors —many of them being practically imponderable. We wanted, above all else to arrive at a formula that would be equitable to all and at the same time reduce the large number of disparities to a common denominator. All of you strive for good plant operation—this we know—and no one should be penalized for natural advantages other plants may have—this we considered. So it became evident that the winner of this award would be the plant showing the lowest cost per kilowatt hour, taking into account wide differences in the cost of fuels in various parts of the country as well as all types of fuel used. I will explain further.

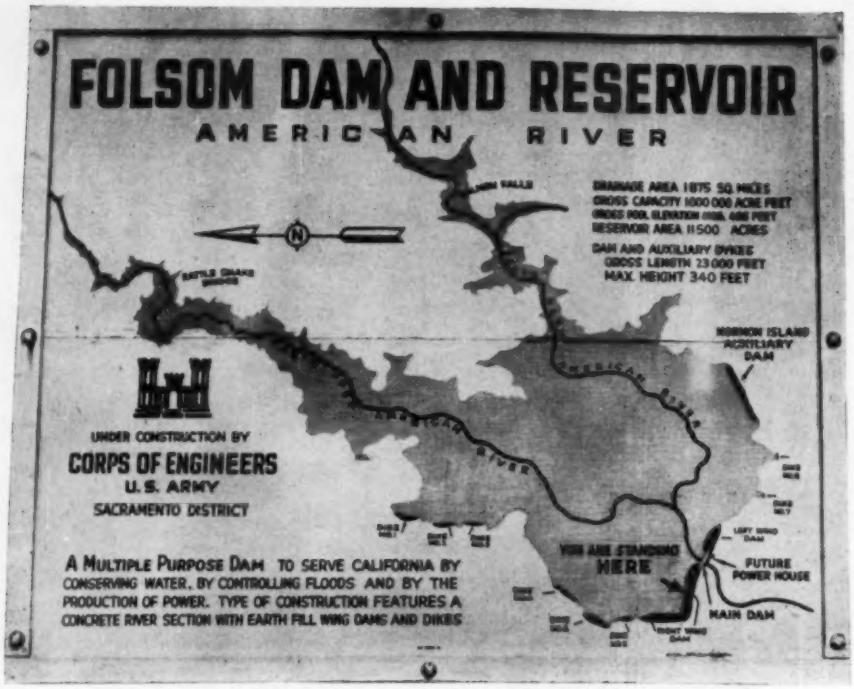
Taking the data from your own reports for the year 1951 as submitted to REA—your total btu. consumption was costed on a uniform basis of 50 cents per million btu.'s. This produced an adjusted fuel cost figure. Then the difference between the adjusted fuel cost and your actual fuel cost became the adjustment figure which was a plus factor where actual fuel costs were abnormally low and a minus factor where fuel costs were higher than normal. This adjustment figure was then added or subtracted—as the case might be—to or from your total production cost as shown on line ten of your reports. Then your cost per net kwh. was calculated on the basis of the adjusted production cost. This procedure brought about surprisingly uniform results among the fourteen plants that were screened by REA for final analysis. And it is interesting to note that the winning plant—under this formula—because of the low fuel costs in its area, suffered a plus adjustment almost equal to its actual fuel cost—and still came out with the lowest cost per net kwh.

I have tried briefly, and as clearly as possible in the time allotted, to explain the purpose and the basis of determining this award. I hope this will mark the beginning of a long period of growth and of friendly competition among your brotherhood of REA plants. We have collaborated extensively with REA in building up this program, and since that august body is so amply represented here today, I am sure they will be glad to answer your questions. Be easy on "Doc" Craig however—he is ex-REA and awfully good natured.

It now gives me great pleasure to tell you that the winner of the first annual DIESEL PROGRESS award for the most efficiently operated of all REA internal combustion plants for 1951 is the Graham County Electric Cooperative, Inc., Pima, Arizona. And if Mr. Howard Helmers, Manager, or his representative will step up, I would like to present him with this replica of a cast bronze plaque which will be sent to him about June 1st to have and to keep in commemoration of this year of excellent operation. My hearty congratulations to you Mr. Helmers,, and to every member of your staff for this splendid achievement.

And now, let me add that someone had to win this award. Had there been a tie, there would have been two plaques awarded here today, I assure you. But it was a close race, and I am happy to nominate two very fine runners up for honorable mention. As second best, I congratulate Mr. Victor Hanson, Manager, and his staff of Western Minnesota Power Cooperative, Benson, Minnesota. In third place, my congratulations to Mr. A. G. Loudon, Manager, and his staff of Clay Electric Cooperative, Inc., for the fine performance of their plant at Worthington Springs, Florida.

The final adjusted costs per net kwh. for these plants, in the order named, was 7.265 mills; 7.467 mills; and 7.49 mills. Three excellent and very close records, but don't rest on your laurels, gentlemen—there were a good half dozen or more plants just a scant mill behind you. Thank you.


FOLSOM DAM AND RESERVOIR
AMERICAN RIVER
DRAINAGE AREA 1875 SQ. MILES
GROSS CAPACITY 1000 000 ACRE FEET
RESERVOIR AREA 11500 ACRES
DAM AND AUXILIARY DYKES
GROSS LENGTH 23 000 FEET
MAX. HEIGHT 340 FEET
MORMON ISLAND AUXILIARY DAM
AMERICAN RIVER
UNDER CONSTRUCTION BY
CORPS OF ENGINEERS
U.S. ARMY
SACRAMENTO DISTRICT
YOU ARE STANDING HERE
FUTURE POWER HOUSE
MAIN DAM
A MULTIPLE PURPOSE DAM TO SERVE CALIFORNIA BY CONSERVING WATER, BY CONTROLLING FLOODS AND BY THE PRODUCTION OF POWER. TYPE OF CONSTRUCTION FEATURES A CONCRETE RIVER SECTION WITH EARTH FILL WING DAMS AND DIKES

Caterpillar motor grader levels fill dirt on construction of the Folsom Dam. Below, Caterpillar No. 12 motor grader equipped with DoMor elevating loader attachment working on the Folsom Dam.

OUT on the American River, near Folsom, California, the Army Engineers of the Sacramento District are not only building a dam, they seem to be building a dam-site. As it turns out, they are simply making a larger dam than the natural topography will permit by adding a few things that Nature left out.

Folsom Dam will be more than a concrete plug in the river. Folsom will be two dams with wings and saddle dykes of rolled earth fill having a gross length of 23,000 feet plus. The reason for building a dam that goes right on up and over the tops of low-lying foothills is that the American River can deliver more water than can be stored without additional dams. It has been estimated that some 2½ million acre feet of storage could be developed on this river, and adequate sites are scarce. Folsom holds only a million, and even that volume was considered high when the Army Engineers first proposed it in August of 1944. But they showed that the terrain would support such storage if the main dam had ample wings, if the saddles between hills were plugged, and if an auxiliary dam were placed through and across an ancient river channel known as Blue Ravine.

The size of Folsom Dam was the subject of much discussion by people of varied interests and purposes, but it was nailed down finally on an engineering basis by a three-way conference between the Corps of Engineers, the State of California, and the U. S. Bureau of Reclamation. The original proposal by the Army to Congress called for a dam within the natural limitations of the site for a capacity of something over 300,000 acre feet. This was to be built in such a way that it could be raised later as the need for water developed. The idea was that a large capital investment should not stand idle waiting for customers, and by 1945 the Corps was favoring a million acre feet with one-step construction.

This "evolution" of Folsom was also reflected in federal legislation. The Corps of Engineers commenced work on October 2, 1948, under authorizations contained in the 1944 Flood Control Act. Subsequently, under the terms of what became known as the Engle Bill, the Central Valley Project Act was amended to include the American River, and the Bureau of Reclamation was authorized to construct a power plant at Folsom, make water distribution studies, and to take over the operation of Folsom Dam on completion of construction by Army Engineers. Today, the Bureau is busy excavating for the power plant, while the Army is building the dam a few hundred yards away. Thus Folsom is an unusual project in more ways than one. Yet a visit to the site reveals excellent technical cooperation with smooth and steady progress.

Getting back to the unusual physical features, this might best be understood by a quick look at the geology of the area. At one time the land area around Folsom was part of the coast line of the North American continent. As the Coast Range emerged, this area became the boundary of an inland sea, until finally it raised to a great sloping plain over which many rivers fingered their way to the sea. Blue Ravine is the ancient channel

of one such river. Deposits of gravel on hill tops and ridges show where other rivers once flowed. After 150 million years or so of these goings-on the original granites are now near the surface of the Folsom site, overlaid by a scant cover of organic soil and decomposed granite. This decomposed granite is to be found in great quantities and it is being used to make a highly satisfactory fill material. Beneath the surface, breakdown of the original rock structure is known to have followed joint planes and fractures to a considerable depth into the earth. This characteristic has made it necessary to carry rock excavation of the abutments somewhat beyond original plans in order to reach a satisfactory solid rock line. This is the physical picture.

At the present time, one solution to the problem is being dramatically illustrated in the excavation and preparation of the Mormon Island damsite—the one that crosses this Blue Ravine. Here engineers and contractor's men are working shoulder to shoulder at least seventy feet below the natural ground line. They have gone through all the gravels, through the layer of soil and decomposed granite and on into solid rock for a short distance. Then, through holes drilled every ten feet, they pumped grouting material until an impervious curtain extending down to as much as sixty feet more was driven into the earth. After these careful preparations, the Mormon Island auxiliary dam is now being rolled safely into place.

An interesting side feature which has required consideration by Army Engineers and contractors alike has been the extensive gold dredging in the damsite areas. After a gold dredge has gone through, the land is literally upside down, with fine stuff on the bottom and rocks on top. While these rocks will make a handy supply for concrete aggregate, they are otherwise a nuisance. The axis of a dam must be cleared of every foot of this material. In the channel of the American River itself hydraulic mining in the mountains, years ago, also contributed its share to a seventy foot layer of gravels on the bottom of the present course of the river. All this will have to come out. Thus we see that Nature left only a small damsite to begin with, and up to now man hasn't helped very much. However, the need for flood control, for water, and for hydroelectric power is sufficient to provide an economic solution for ways and means of constructing the Folsom Dam. And the business of building such a dam and—for all practical purposes a damsite, is moving along.

**Two Gardner-Denver and two Chicago Pneumatic compressors working on the Folsom Dam supplying air for drilling shot holes for power house excavator. All four Caterpillar diesel equipped.**

**Two Gardner-Denver and two Chicago Pneumatic diesel driven compressors supplying air for the operation pictured above.**

## Supervising

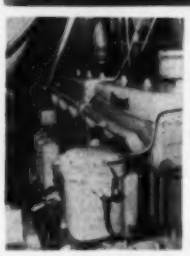
. . . continued from page 58 . . .

fuel injection equipment. It is a well known fact that no two injectors or atomizers will give the same results, and it is almost humanly impossible to adjust them so that they will function alike over a period of time. This may be due to any number of reasons, such as materials, spring tension cleanliness of the atomizers, tightness of the pumps, condition of the delivery valves, rack settings, etc. Your writer has been criticized more than once for insisting on at least a monthly check on the atomizing equipment, many engineers claiming that a six months checkup is adequate. I cannot condone this theory with our present day variation in such equipment. We feel that under the circumstances frequent inspection is good insurance and a necessity. We have renewed atomizers on our units on the same week end, adjusted the spring tension and set this as uniform as it is possible for humans to do it, inspected them in three or four weeks and found springs broken, spindles distorted, needle valves pounded out or tips broken on one atomizer, while that in an adjoining cylinder will be in as perfect a shape as the day it was previously installed. You ask why? Well, in most instances it is due to a variation of the metals involved, one spring may be more brittle than another, one spindle may be of softer material than another. So what happens? A spring breaks after a few days operation and the tension is gone. That condition effects a change in the operation of that particular cylinder and piston. We had an instance not long ago of a fuel pump going bad. A piece of dirt or grit got between the plunger and barrel of a particular pump. How long it had been in the fuel system is problematical, but at any rate it lodged there and the pump failed to function. It was immediately cut out and a new pump installed to replace the defective one. But here was a situation which effected that particular cylinder, and caused a condition unfavorable to either operation or a test should one have been under trial at the time.

I could go on and discuss many other features that would affect tests and while I agree that they are good experiments and under conditions of normal operation can prove invaluable in determining to an extent, the proper lubricant to use to cut maintenance costs, I still maintain that in running such tests, all cylinders should be tried with the same type of oil for one test and then changed to a different brand for a similar test, in order to get any where near conclusive results, and these will not be conclusive unless the overall equipment and operating conditions are the same under any test.

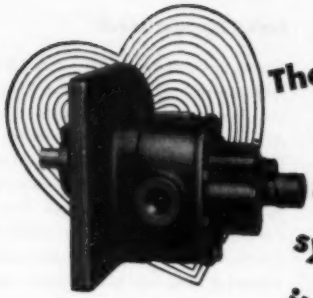
"Off Again--On Again"...
Fast work at each relay point helped a little. Every moment the rider could save made it easier for his relay string to keep up their Pony Express schedule. But profits for the contract rider lay in using only the best horses; those that could recover quickly and be fresh again for each run.
Otherwise, a corral full of extra mounts were needed. They ate up profits the way remachining of worn engine parts leads to higher Diesel operating costs.
That profit-destroying practice has been proved unnecessary. PORUS-KROME* and VANDERLOY M renew worn cylinder liners and crankshafts — make them recover with an actual gain in strength and endurance.
Liners renewed by Van der Horst have out-lasted as many as four new, unprocessed parts. Yet the cost of this long-lasting renewal is less than the price for each new, unprocessed replacement!
Why, then, keep a "corral full" of odd-sized Diesel parts? All of them — including those ready for scrap — can be restored to peak efficiency with PORUS-KROME and VANDERLOY M.
If you've been a little "on again, off again" about deciding to use Van der Horst processing, we invite you to ask us how the cumulative costs of remachining can be turned to dividends in your own Diesel operation.
* * *
*PORUS-KROME is a dense, hard, wear and corrosion-resistant chromium, produced by the Van der Horst Corporation of America, and which gives working surfaces an infinite number of tiny oil-retaining reservoirs for perfected lubrication.
VAN DER HORST CORPORATION OF AMERICA
OLEAN, N. Y.
U. S. PATENTS 2,048,578, 2,314,604 and 2,412,698
DW-52E
PORUS - KROME
VAN DER HORST


## Florida Shrimper



The *Premier II*, pictured above, is a 65-ft. by 18-ft. shrimp trawler built and designed by the Tampa Marine Company of Tampa, Florida, for the Premier Seafood Company of Naples, Florida. The vessel is powered by a D13000 Caterpillar diesel, 120 hp. with a Snow-Nabstadt clutch. Lighting is provided by a Fairbanks-Morse model 45 B-3 diesel with a Fairbanks-Morse 3 kva. generator. A Columbian propeller moves it at 9 miles per hour. Cooling for the main engine is by keel cooler method with a radiator for the Fairbank-Morse power unit. Tampa built Yocam 32 volt, 270 ampere batteries are used. The trawler also contains Groco electric toilets and a Strausburg deck winch. The Caterpillar diesel was supplied by Shelley Tractor of Tampa. The vessel was launched in February this year and is now shrimping in the Gulf of Mexico. Herbert Storter is the skipper.

**DIESEL ENGINE CATALOG, in its Seventeenth completely re-edited, revised and expanded edition, comes off the press June 14th. An invaluable aid to design engineers and buyers, it incorporates the latest diesel engine specifications and descriptions. Order your copy of this limited edition now. Profusely illustrated. $10.00. Write DIESEL PROGRESS, 816 North La Cienega Blvd., Los Angeles 46, Calif.**



## The HEART of a diesel lubricating system is its PUMP

Rotary geared pump with special flange mounting becomes integral part of diesel engine when installed. Note opening above relief valve for tachometer.

Modern diesel operation generally requires a pressure lubricating system — and the vital element is the pump. Thousands of Brown & Sharpe pumps are now providing reliable service month after month without interruption, for lubrication, transfer, or booster systems. Available with various types of flange mountings and special internal construction to meet specific requirements. Write for catalog. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

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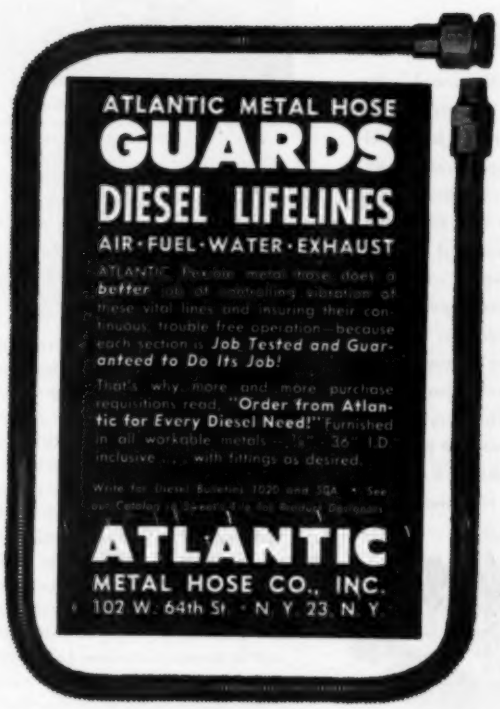

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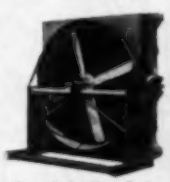
## YOUNG JACKET WATER COOLERS FEATURE ECONOMICAL CLOSED-SYSTEM COOLING

Our congratulations to Graham County Electric Co-op, Inc., Pima, Arizona, for its recognition as the nation's most efficiently operated REA internal combustion plant. Eight Young Jacket Water Coolers, with a capacity of 224,000 BTU per hour, are used to cool the jacket water and lube oil of five Cooper-Bessemer, supercharged dual fuel engines operating on natural gas. Automatic shutter controls, multiple-unit installation, and Young's excellence of product provide the "winning combination" for operating economy. Records such as this demonstrate the capability of Young's representatives. Flournoy & Everett, Inc., Los Angeles, engineered the Pima, Arizona, installation.



Young Jacket Water Coolers, for gas, gasoline, or Diesel engines, available in many sizes for single or multiple use.

Young Shell and Read or removable Tube Bundle Heat Exchangers are made in single- or two-pass styles; stocked for quick delivery and economy.

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## Expressway System

Expressways started to become a reality for Milwaukee after 10 years of planning and engineering preparation when ground was broken recently to mark the physical start of a system that will cost an estimated 100 million dollars when completed in 20 to 25 years. Mayor Frank P. Zeidler took the first bite out of the ground on the 44th street leg with an Allis-Chalmers HD-9G tractor and front-end shovel. Instead of the traditional hand shovel, power equipment was used to typify the magnitude of this project which eventually will sweep through the center of Milwaukee and outward in all directions. The contract for 1800 feet of preliminary work on the 44th street section was awarded by the Wisconsin State Highway Commission to the Speedway Contracting Company and the Druml Company, Milwaukee. It amounts to $700,404.

These contractors will build the access underpass to the new Milwaukee County Stadium near where the ground-breaking ceremonies were held; three culverts; storm and sanitary sewers to drain the area and connect with the general sewer systems; move 168,000 cubic yards of muck; and backfill the area with 150,000 cubic yards of sand and gravel fill. The way will be prepared for construction of the 44th street express roadway between West National Avenue on the south and West Wisconsin Avenue on the north. This unit eventually will be extended northward to connect with West Lisbon Avenue at 47th street. It will be Wisconsin's first expressway. Federal and state aids are expected to cover about 85 per cent of the total expressway project cost.

## New Appointment

The appointment of Mr. Ronald F. Dusenbery, formerly regional manager for Koppers Company, Inc., Piston Ring Division, as sales manager of the American Hammered Automotive Replacement Division, Sealed Power Corporation, Muskegon, Michigan has been announced by Rick Murbarger, general sales manager. The Sealed Power Corporation acquired the American Hammered Automotive Piston Ring Division of Koppers Company, Inc. on March 22nd and immediately set up their own American Hammered Automotive Replacement Division. They have since been in the process of moving factory inventories from Baltimore, Maryland to Muskegon and in reorganizing their American Hammered sales division. A large number of the former Koppers field men have been retained. Mr. Murbarger said that new sales and advertising plans have been developed so as to give the American Hammered jobbers a well balanced and aggressive sales program.

## Dam Project

Two International TD-24s pulling a Euclid loader on the Trenton Dam project. The loader loads about 1,200 cubic yards an hour.

Work on the Trenton Dam which will span the Republican River, two miles west of Trenton, Nebraska, is approximately a year ahead of schedule, according to Project Manager K. T. Norwood. Clearing and excavation work was begun in the spring of 1948. Vinnell-United-Bell Company began work on the big earth fill structure in the fall of 1950 and two-thirds of the 8-million cubic yard earth-moving phase has been completed. The finished dam will be 8,800 feet long and 140 feet high with a width of 800 feet at the base tapering to a 25-foot crest. There will be a spillway on the north end of the dam with an outlet for an irrigation canal on the southern end. The construction is directed by the U. S. Department of The Interior, Bureau of Reclamation, and is a part of the Missouri River Basin Project. Purposes of the dam are irrigation, flood control, sediment retention, river regulation and to provide recreational facilities. Trenton Dam's reservoir which will be known as Swanson Lake, will have a storage capacity of 365,000 acre-feet of water. Completion is now scheduled for fall of this year.

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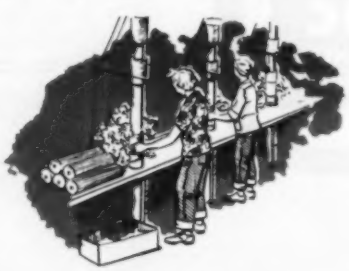
# A New Winslow Factory For Faster Service

**The friendly people who live and work in the prospering city of Murray, Kentucky, have welcomed a new industry to their community. Its center is a new factory, devoted to the manufacture of Winslow Filters and Elements. This industry, with its personnel and payroll, is important to the people of Murray . . . but it is even more important to everyone who needs protection for the fuel and lubricating oils used in hard-to-replace and costly-to-repair engines or machinery. The new factory is important to all of you who place a premium on truly dependable filtration performance, because it means that there will be *more* of these fine products available for your use, and they can be shipped *quickly*, more *economically*, to wherever you need them!**

In the East or in the West, the men and women who make Winslow Filters and Elements take genuine pride in their workmanship. Their skill and experience stand behind the amazing warranty that supports every Winslow product. Ask for full details!



WINSLOW FILTERS

Winslow Engineering Company 4069 Hollis Street, Oakland 8, California

## Two Books on Preventive Maintenance

Two important and helpful booklets have been published by The Cooper-Bessemer Corporation. Titles are, "Practical Preventive Maintenance for Gas Engines," and "Practical Preventive Maintenance for Gas-Diesel and Diesel Engines." Chapter headings are identical for both booklets and they indicate the thoroughness with which the overall subjects are treated. Here they are:

1. Why Maintenance is More Important Today.
2. Other Maintenance Programs and Their Disadvantages.
3. A Practical Preventive Maintenance Program for All Installations.
4. Signs, Indicators and Tests for Detecting Blow-by.
5. Lubricating Oils.
6. Bearings.
7. Fuel Oil Systems.
8. Engine Balance.
9. Signs and Indicators Used to Determine Conditions of Other Important Engine Parts.

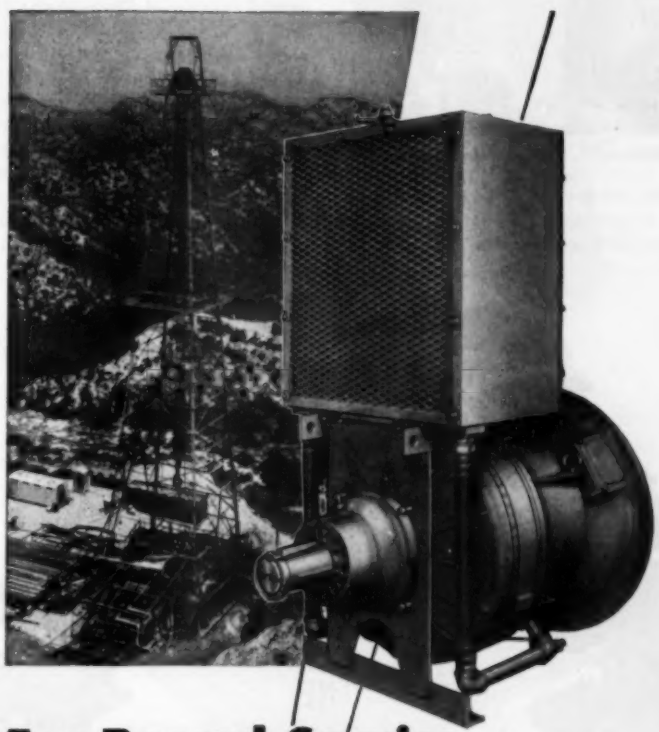
Both booklets were written by James E. Caldwell Service Engineer, The Cooper-Bessemer Corporation, but the author's approach is purely objective and his suggestions cover the field of maintenance generally. Anyone concerned with the operation and maintenance of the types of engines mentioned will find much that applies to daily problems in these booklets. They are priced at $2.00 each and can be obtained direct from The Cooper-Bessemer Corporation, Mt. Vernon, Ohio.

## Service Truck

Inspecting a new service truck, Philip W. Smith (right), acting manager, Hastings, Nebraska, branch, Cummins Diesel Sales Corporation, Omaha, shows W. B. Lawrence (left), the Sales Corporation's vice president and general manager, the parts and tool bins built into the body of the Hastings' new service truck. Mr. Smith will head a new Cummins sales and service location at Hastings that officially opened for business on May 1. The Hastings building is located on U. S. Highway No. 6, on the southside of the Nebraska town.

## Bulletin Available

Caterpillar's new No. 90 scraper is highlighted in a broadside (Form 30337) available from Caterpillar Tractor Co., Peoria, Illinois, or from Caterpillar dealers. In addition to specifications, the broadside lists features of this large capacity scraper and keys them to a large model view picture for handy reference.

**For Record Service... or Record Performance**

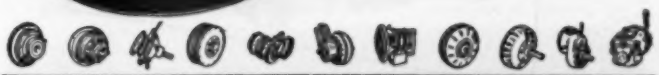
When Barnsdall Division of Sunray Oil began a systematic inspection and overhaul of a number of their Twin Disc Series 16,000 Hydraulic Torque Converters, after three and one-half years of continuous service, here's what they found on the first converter: *"Bearings and fluid seals in good condition and re-used. Necessary to replace only gaskets and 'O' rings. Two of the first stage guide blades in the turbine housing were loose and were therefore re-riveted."*

That's real wear-life—the kind you can expect from a Twin Disc Three-Stage Hydraulic Torque Converter.

And you can expect real performance, too. For three of these same Twin Disc converters are on the rig which drilled 3500 feet in 24 hours . . . a record in the California field . . . and later came out of the hole from approximately 9000 feet in 114 minutes.

In California or in every field the world over, you'll find Twin Disc Hydraulic Torque Converters the choice of leading drillers because these men know Twin Disc offers the best in converter wear-life, the best in rig wear-life, and the best in performance. Write today for Bulletin 135-D, Twin Disc's *new* literature on torque converters.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES



TWIN DISC CLUTCH COMPANY, Racine, Wisconsin HYDRAULIC DIVISION, Rockford, Illinois

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## Specialized Development Group

R. M. Dilworth — O. F. Brookmeyer

Electro-Motive Division of General Motors has established a specialized group of its most experienced personnel to study ways in which engineering and manufacturing techniques and facilities accumulated in the development of the diesel locomotive may be applied in the development and manufacture of other products beneficial to American railroads. Nelson C. Dezendorf, general manager of Electro-Motive Division and vice president of General Motors, announced the initial assignment of two of Electro-Motive's pioneers to the new group. They are: O. F. Brookmeyer, former general sales manager and R. M. Dilworth, former chief engineer, who for the past few years has headed the advanced engineering activity of Electro-Motive. Mr. Dilworth will explore the engineering aspects and Mr. Brookmeyer the commercial availability aspects of and facilities. Others will be added to the group post-diesel application of Electro-Motive's skills as its work grows.

"The same far-sighted planning that made the diesel locomotive available in large volume to all American and foreign railroads will be directed into additional channels to utilize the skills of Electro-Motive's people," Mr. Dezendorf said. Mr. Dezendorf made it clear that these future developments would not be put in operation until railroad dieselization demand will permit a reduction in current high locomotive manufacture.

"It still will be several years before railroad demand for diesel locomotives is satisfied to the point that any major portion of our man power and facilities could be diverted to other activities," Mr. Dezendorf emphasized.

## England

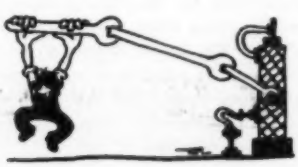
. . . continued from page 60 . . .

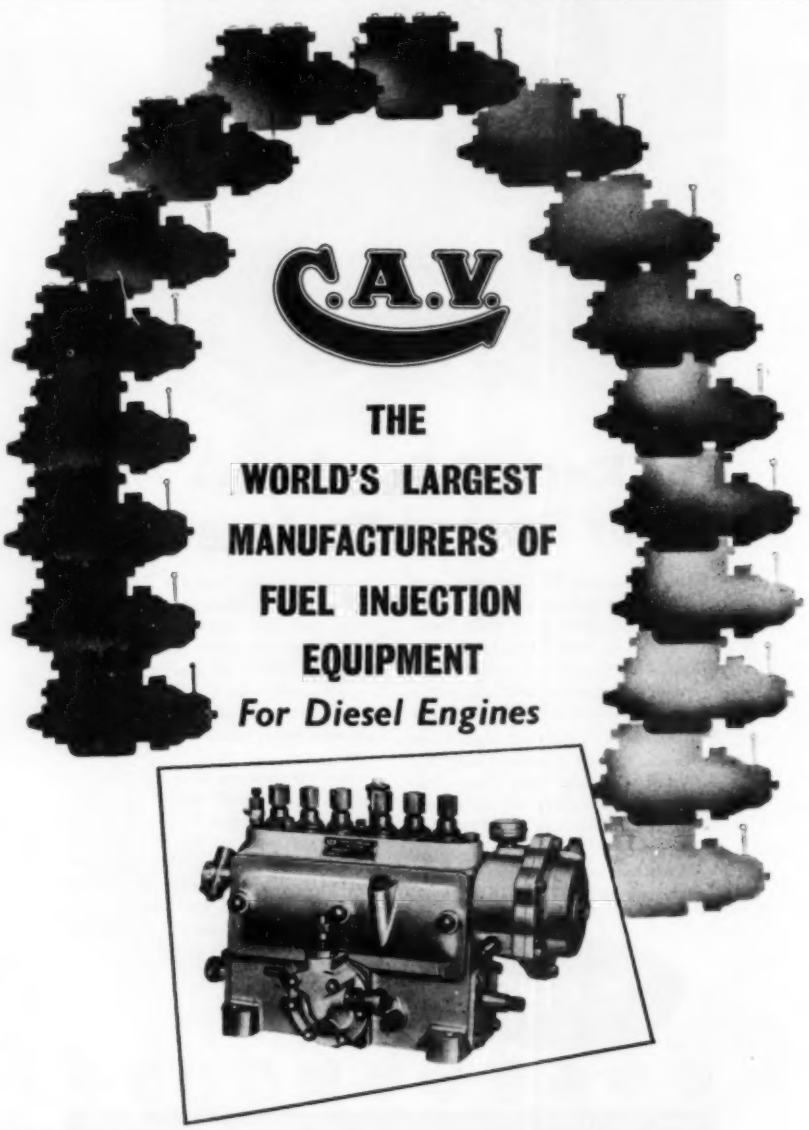
High degree of center point steering. Steering; worm and nut type. Steering wheel, 21 in. (533 mm.) diameter, 5½ turns approximately lock to lock. Rear axle; alternative units for 8 ft. 0 in. (2, 438 mm.) or 7 ft. 6 in. (2,286 mm.) overall width. Underslung effect worm drive, 8 in. (203 mm.) centers, fully floating. Hubs mounted on taper roller bearings. Bellows type oil seals. Ratios: standard 5 1/6:1, alternatives 4 4/7 and 5 4/5:1. Suspension; reverse camber semi-elliptic springs. Front: 4 ft. 2 in. (1,270 mm.) centers, 3½ in. (89 mm.) wide. Rear: 5 ft. 2 in. (1,575 mm.) centers, 3½ in. (89 mm.) wide. Torsion bar stabilizer gear.

Wheels and tires; for 8 ft. 0 in. (2,438 mm.) width all sizes up to 11.00 in. section on 7.33 in. wide 3-piece rims. For 7 ft. 6 in. (2,286 mm.) width, 11.00 in. x 20 in. front on 7.33 in. 3-piece rims and 9.00 in. x 20 in. rear on 6.00 in. 4-piece rims. Fuel supply; 35 imperial gallons (160 litres). Electrical equipment; insulated return. 24 volt compensated voltage control system. 24 volt, 7 in. (178 mm.) dynamo and 24 volt axial type starter motor mounted on engine. 185 ampere hour lead-acid batteries. Radiator; top and bottom tanks made in sheet brass pressings bolted to the tube block. Chassis dimensions; wheelbase: 16 ft. 4 in. (4,978 mm.) or 17 ft. 6 in. (5,334 mm.)

### Overall Final Drive Ratios

| | Rear Axle Ratio | | |
|---|---|---|---|
| GEAR | 4 4/7 | 5 1/6 | 5 4/5 |
| 1st | 20.62 | 23.30 | 26.15 |
| 2nd | 11.57 | 13.07 | 14.67 |
| 3rd | 7.50 | 8.47 | 9.51 |
| 4th | 4.57 | 5.16 | 5.80 |
| Reverse | 31.60 | 35.65 | 40.02 |

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## Offers New Service

Fully reconditioned engine heads for most standard diesels ready for shipment on an exchange basis from the Guth-Pascoe Company.

Specializing in the rebuilding of cracked and broken castings, engine blocks and cylinder heads, the Guth-Pascoe Company has announced a new service. They can immediately replace most popular diesel heads on an exchange basis. The replacement heads are fully reconditioned and completely guaranteed by the company. Full credit is given for the old, cracked head when received by the rebuilder.

The Guth-Pascoe Company asserts that there is practically no limit to the size or complexity of castings that they can restore. The application of their fusion process is not limited to cast iron. It can also be applied on all ferrous metal and many non-ferrous metal castings, including aluminum. The Guth Fusion Process was developed and patented in many of its phases by Carl Guth who, with A. H. Pascoe, heads the firm. They emphasize that no matter how badly broken a casting process may be, it can be restored by means of their process to "as new" condition and performance. The Guth-Pascoe Company is located at 1933 East Washington Street, Phoenix, Arizona.

## Periodic Maintenance Pays Off

Owner Stanley Iskra, Bellevue, Ohio, reports a good example of unusually long transmission service life as a result of careful periodic maintenance and lubrication. Mr. Iskra logged 750,000 miles on his transmission without overhaul—the equivalent of 30 times around the world—with a Corbitt 28-TD-1762 tractor, powered by a 200 hp. Cummins diesel and geared by a Fuller 5-A-920 transmission. The rig rolled off these record miles on a steel-hauling run from Pittsburgh to Detroit and nearby points, part of each trip pulling a double-dolly train. When the big Corbitt was finally ordered in for repairs, the transmission was still running quietly with the original parts. Mr. Iskra reports there was no gear-noise; the transmission was opened for routine overhaul and the teeth found in good condition in spite of the terrific pounding they had taken.

This is the inexpensive Nugent "Throway" recharge. Easy to install, these replaceable packs last up to twice as long as ordinary recharges. They are available for most all Nugent Fig. 1280 fuel or lube oil filters.

The Nugent Filter on this Sterling 6 cylinder super-charged 400 K.W. diesel-electric generator plays an important part in keeping things humming at one of Uncle Sam's South Pacific radio stations. The Nugent Filter contributes to this vital operation by keeping lube oil impurities away from the engine's working parts, filtering out 99.8% of the dirt. This is the kind of filtering protection that really pays off with longer engine life, less maintenance, substantial oil savings—and most important in an installation of this type—greater dependability. Nugent lube oil filters like the Fig. 1280 CP used here come in a wide range of capacities to fit your particular needs. Write for full details.

Wm. W. Nugent & Co., Inc.
415 N. Hermitage Ave. CHICAGO 22, ILLINOIS

## Vice Presidents

Three executives of Aluminum Company of America have been elected to newly created vice presidencies, the company announced recently. Gordon W. Cameron, Alcoa's treasurer since 1943, becomes vice president and treasurer; Arthur P. Hall, director of public relations and advertising, becomes vice president in charge of those fields; and C. F. Nagel, Jr., chief metallurgist, assumes the third new vice presidential post. Mr. Cameron, a graduate of Williams College in 1916, began his Alcoa career the same year in the sales department. By 1924 he had been made manager of the company's Boston district sales office. In 1941 he was appointed coordinator of Alcoa's program of Defense Plant construction for World War II, and was elected the company's treasurer two years later.

Mr. Hall attended the University of Wisconsin, and started with Alcoa in sales work at St. Louis, Mo., in 1929. In 1932 he was transferred to New Orleans, and went to the company's Washington district sales office in 1939. He became manager of the Washington office in 1943, and was named an assistant secretary of the company. He was made director of public relations and advertising in 1949. Mr. Nagel joined Alcoa in 1915 after he was graduated from Cornell University. In 1923 he became assistant director of the company's Technical Direction Bureau and in 1928 became chief metallurgist of the Fabrication Division. Since then he has been made chief metallurgist for Alcoa. He is also chairman of the Technical Committee and of the Research Policy Committee.

Diesel Power Units Use
Handy Power Take-Offs
Witte diesel units provide dependable, continuous power, at minimum cost. Equipped with ROCKFORD clutch POWER TAKE-OFFS, Witte Power Units are adaptable for the most rugged oil field service, and are completely weatherproof. Let ROCKFORD clutch engineers help you design practical, economical and reliable transmission controls for your power units.
ROCKFORD CLUTCH DIVISION
B-W ENGINEERING MAKES IT WORK
B-W PRODUCTION MAKES IT AVAILABLE
ENGINEERING BULLETIN SENT ON REQUEST
ROCKFORD CLUTCHES


## New Assistant Chief Engineer

Robert A. Hunt

Mr. Robert A. Hunt on the engineering staff of the Rochester Manufacturing Company, Inc., has been appointed assistant chief engineer. Mr. Hunt who has been handling special development work and design for the company for the past five years will specialize on design and development problems in connection with electrical instruments for the indication of liquid level, pressure, and temperature. The company is inaugurating an extensive research and development program on electrical instruments for the tractor industry under the general supervision of Mr. R. A. Tollefsen, chief engineer.

## Nordberg Distributor

Appointment of Overvold Distributing, Inc., 13 Fourth Street, Moorhead, Minn., as distributor for Nordberg 44FS diesel engines has been announced by Nordberg Manufacturing Company, Milwaukee 1, Wis. In this position the firm will cover North and South Dakota, northwestern Minnesota, northern Nebraska and the eastern counties of Montana and Wyoming for Nordberg. Overvold Distributing, Inc., was founded in Watertown, S. D., in 1928 and was moved to its present location in 1934 because of the proximity of markets for electrical generating equipment for farm service. In 1939 the firm expanded its coverage to include ranches, hatcheries, hospitals, resorts, etc., with the result that its personnel has extensive experience in the application of diesel light and power plants for continuous or emergency service. President and sales manager of the company is Ernest Overold and H. Overold is vice president and office manager. Complete stock and repair service in Moorhead coupled with an experienced and well equipped staff of servicemen located in the territory provide the firm with excellent facilities for handling its new distributorship.

## Sales Manager

R. D. Redner

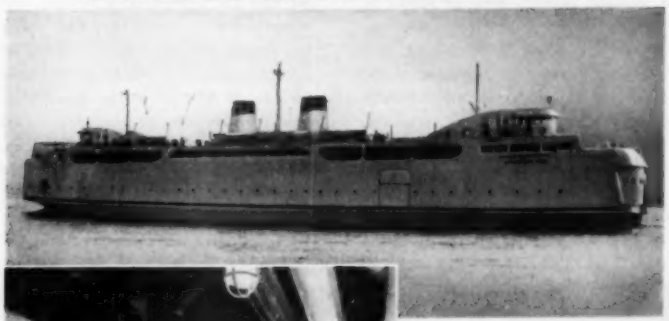
Stephens-Jones, Inc., construction equipment distributors of Des Moines, Iowa, has announced the appointment of R. D. Redner as diesel engine sales manager. Mr. Redner was formerly sales representative of the Detroit Diesel Engine Division of General Motors in Iowa and surrounding states. As Stephens-Jones, Inc., represent Detroit Diesel in Iowa and several counties in Nebraska, Mr. Redner will continue his association with the G-M diesel engine in his new capacity.

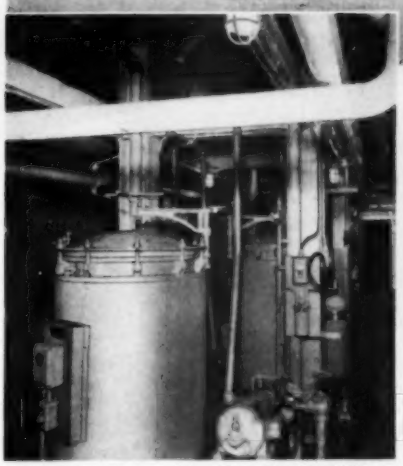
**Test Locomotive**

The West Coast's only stationary test locomotive engine has now "traveled" the equivalent of 120,000 miles. This trackless diesel engine was installed last spring at the Martinez Research Laboratory of the Shell Oil Company for testing lubricants and fuels. It dwarfs other automobile and industrial engines located in adjacent rooms and is exactly the same engine as those in standard switching locomotives seen in rail yards the country over. It's also the blood brother of those familiar giants that pull our fleetest trains across the country. Mounted on a concrete and steel base, the six-cylinder, 600-horsepower diesel has proven to be ideal laboratory equipment. Already it has operated more than 3,000 hours—or the equivalent of 40 trips between San Francisco and New York.

The installation of the big testing engine at Martinez is evidence of Shell's special attention to diesel engine problems as a result of the railroads' increasing reliance on diesel power. As the railroads put more and bigger diesels on the job, mechanical growing pains and deficiencies in lubricants, of course, began to be felt. Already the initial tests with the stationary engine at Martinez have contributed to the development of new lubricants that will allow locomotives to remain on the job for years without a major overhaul. The locomotive engine weighs 30,000 pounds and rests on a six foot, steel-topped concrete base that is set in cork to absorb vibrations. According to Shell engineer F. H. Caudel, it consumes a barrel of diesel fuel an hour but uses up only about a quart of lubricating oil in the same time. Power generated by the test engine would be sufficient to meet the peak load needs of 400 homes. It is transformed into electricity by a standard railroad dynamo which is attached as a unit to the engine. The output of this generator is measured accurately and becomes the basis upon which the efficiency of the engine is computed.

# ABOARD THE "WORLD'S LARGEST DOUBLE-ENDED FERRY"...





Both engine rooms of the "Vacationland" have two Model I-1118-8E cartridge filters set between two 2360 HP engines. Cartridge replacement is facilitated by cover-lifting device.

**HOFFMAN**
*Cover-Lifting*
**CARTRIDGE FILTERS**
***Stand watch over* LUBE OIL CLARITY**

Plans and specifications for the "Vacationland," recently placed in service by the Michigan State Highway Department, included many special features. For the protection of lube oils used in the four engines, Hoffman Cartridge Filters were selected. Bearings, cylinder walls and other parts are safeguarded against impurities by eight 11 x 18 cartridges arranged in each unit for simple, effective filtration. Swing-bolts and cover-lifting device on each unit speed cartridge replacement.

*Engine Builders —Operators*

**FILTRATION ENGINEERING SERVICE**
***without obligation — Write for it!***

For the right answer to your filtering problem (on new equipment or replacement), consult a Hoffman filtration engineer. He will survey your requirements, furnish recommendations based on a detailed analysis of all factors. Write for it — and for descriptive bulletins.

INDUSTRIAL FILTRATION DIVISION

**U.S. HOFFMAN MACHINERY CORPORATION**
**212 LAMSON ST., SYRACUSE 6, N.Y.**

**CANADIAN PLANT: CANADIAN HOFFMAN MACHINERY CO., LTD., NEW MARKET, ONT.**

## Named to Field Sales Post

O. B. Wilson has been made field sales manager for the Industrial Division of Minneapolis-Honeywell Regulator Company, it was announced recently by L. Morton Morley, vice president of Honeywell and its Brown Instruments division. Mr. Wilson succeeds William H. Steinkamp who was recently made general sales manager of the division. Mr. Wilson will supervise all industrial field sales and service personnel for all Industrial Division products. Mr. Wilson joined the Brown division in 1923. He later became industrial manager in Chicago, New York and other offices. He was made industrial manager for the eastern sales region in 1948 when he transferred from the New York branch to the company's Philadelphia headquarters.

## 24th Annual O.G.P. Conference

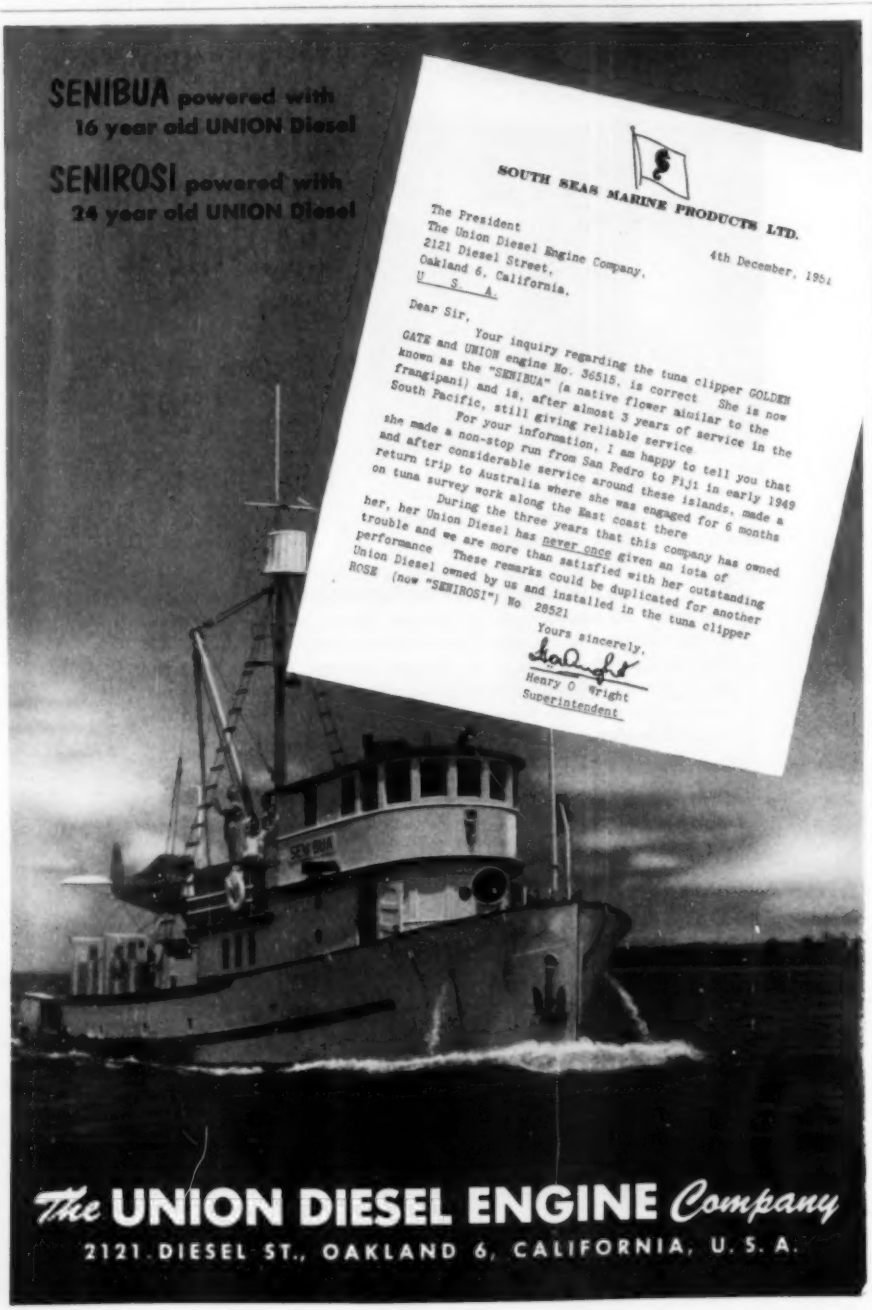
All who are interested in design, operation and maintenance of diesel, dual-fuel and gas engines are invited and urged to attend the 24th Annual Conference and Exhibit of the Oil and Gas Power Division of A.S.M.E. at the Hotel Statler, Buffalo, New York on June 23 through 27, 1952. The program will include technical sessions, social periods for meeting old friends and plant inspection trips in Buffalo and vicinity.

Technical program. Monday, June 23, a.m. Presentation of three papers on "Crankshafts and Related Subjects" by Dr. M. Ino, Japan; J. D. Swannock, and R. J. Maddock, Fairbanks, Morse & Co.; and F. P. Porter, American Locomotive Company. At 12:30 p.m., a welcome luncheon with Ray G. Tessmer, chairman, Buffalo section ASME, presiding. Address of welcome will be made by Chas. C. Fitchner, executive vice-president of the Buffalo Chamber of Commerce. The speaker will be R. J. S. Pigott, president and fellow ASME. The Technical afternoon session will feature two papers on "Engine Lubrication" by W. J. Blessing, Worthington Corporation; and R. J. S. Pigott, president ASME, Gulf Research and Development Co.

Tuesday, June 24. The morning session will consist of a special lecture on "Heat Transfer" by C. F. Taylor, of M.I.T. An inspection trip through the Schoellkopf Hydro-Electric, Niagara Falls will be the feature of the afternoon. The Wednesday, June 25, sessions will include two technical sessions. Presented in the morning will be three papers on "Spark Ignition Gas Engines" by Wallace Newcomb, Ingersoll-Rand Co.; William Kauffman, Worthington Corp.; and Sidney E. Miller, American Bosch Corp. The afternoon session will be a panel discussion on "Engines of High Specific Output." Chairman will be George Steven, Worthington Corp. Panel members will include Cmdr. Paul Straub and Raymond A. Coulombe, Bureau of Ships, U.S.N.; Don Bohn, Aluminum Co. of America; John Newton and Cliff Allen, Thompson Products Co.; and John Pennington, Koppers Co. The Annual Banquet (informal) will take place in the evening. Harold W. Whiting is chairman of the arrangements committee. Toastmaster will be E. J. Schwanhausser, executive vice-president, Worthington Corp. and past president, DEMA. Remarks by Robert Cramer, Jr., chairman, executive committee, Oil and Gas Power Division, ASME. The speaker will be Rob Roy MacLeod, commercial manager, Niagara Mohawk Power Corp. His address will be "The American Package."

Thursday, June 26. Three papers on "Diesel Engine Power Plants" by Glenn Yarger, Waverly, Iowa; Everett Rauschenberger, REA; L. C. Harbert, Engineering Controls, will be delivered in the morning. An inspection trip of the Worthington Corp., Buffalo, will take place in the afternoon. An all day inspection trip to Clark Bros. Co., Inc., and Van Der Horst Corporation, Olean, N. Y., is planned for the following day, Friday, June 27.

The ladies activities for the National Meeting of the Oil and Gas Power Division of the ASME will feature such events as a shopping spree and trips through a furniture and silverplate company, luncheons and bridge. The welcome luncheon and a "get acquainted" tea on Monday will open the program fo the week. The Oneida Silver Co., Canada, manufacturers of Community Plate, will conduct an inspection trip of their plant Tuesday, after which, the women will join the men on a sight-seeing trip of Niagara Falls. There will be time to browse through the English china shops before dining in the Rainbow Room of the General Brock Hotel. Early morning risers on Wednes-



SENIBUA powered with
16 year old UNION Diesel
SENIROSI powered with
24 year old UNION Diesel
SOUTH SEAS MARINE PRODUCTS LTD.
The President
The Union Diesel Engine Company,
2121 Diesel Street,
Oakland 6, California,
U S A.
4th December, 1951
Dear Sir,
Your inquiry regarding the tuna clipper GOLDEN GATE and UNION engine No. 36515, is correct. She is now known as the "SENIBUA" (a native flower similar to the frangipani) and is, after almost 3 years of service in the South Pacific, still giving reliable service.
For your information, I am happy to tell you that she made a non-stop run from San Pedro to Fiji in early 1949 and after considerable service around these islands, made a return trip to Australia where she was engaged for 6 months on tuna survey work along the East coast there.
During the three years that this company has owned her, her Union Diesel has never once given an iota of trouble and we are more than satisfied with her outstanding performance. These remarks could be duplicated for another Union Diesel owned by us and installed in the tuna clipper ROSE (now "SENIROSI") No. 28521.
Yours sincerely,
Henry O Wright
Superintendent
The UNION DIESEL ENGINE Company
2121 DIESEL ST., OAKLAND 6, CALIFORNIA, U. S. A.

day are invited to be guests of a radio program, "Luncheon at the Lenox." This program encourages individual participation. A tour of the Kittinger Furniture Co. will follow. A bridge luncheon at the newly erected Yacht Club, situated on Buffalo's beautiful waterfront will precede the evening banquet to which the women are invited.

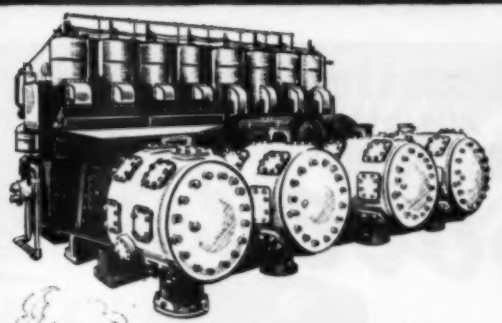
### Honors Racing Driver

A testimonial dinner for Freddie Agabashian, veteran Albany, Calif., race driver, was recently sponsored by Watson & Meehan, northern California and Nevada distributor of Cummins Diesel engines, in the Fairmont Hotel, San Francisco. Mr. Agabashian will pilot the Cummins Diesel Special in the Memorial Day 500-mile race at Indianapolis, his sixth race on the 2½ mile track. He has served the Cummins Engine Company as a consultant since January 1. R. P. Meehan, managing partner of Watson & Meehan, was toastmaster, and Don J. Cummins, vice president, engineering, Cummins Engine Company, was the speaker. Mr. Cummins explained that the racer has an experimental horizontal engine with a piston displacement of 401 cubic inches, 4⅛ in. bore, and 5 in. stroke. It will weigh between 700 and 750 pounds as compared to the 535 pounds of Offenhausers which power most of the big car racers. The extreme lightweight, for a diesel, was achieved by using aluminum for the cylinder block and heads, and magnesium for the other castings.

Mr. Cummins said the engine will turn at more than 4000 rpm. and will produce more than 350 hp. Mr. Agabashian said he hopes to qualify for the 500-mile race at a speed approaching 140 mph. Four times in 34 years of constant high-speed diesel pioneering, the Cummins Engine Company has transformed standard diesel truck engines for engineering tests in Indianapolis Speedway races. Each time Cummins Engines have dramatized diesel advances and have brought new honors to the industry.

Just as we go to press comes the news that the Cummins powered car, driven by Agabashian, earned the coveted pole position at Indianapolis on May 19th with an all time track mark of 138.010 hpm. for the ten time run. He also set a new lap record of 139.104 mph. The old track record was 136.872 mph. and was made last year by Walt Faulkner. The Cummins diesel car is, as most of our readers know, entered in the 500 mile race at Indianapolis on Memorial Day, and it looks as if there is a strong possibility of a diesel car winning this famous event for the first time in history.


For DEPENDABILITY IN REFINERY EQUIPMENT



**The Correct Fastener for the Job**

These Erie bolts have at least one thing in common—they are designed to hold against maximum strains imposed by pressure, temperature, or corrosion. They differ in material, shape and threading as the job directs. For 38 years, we have geared our plant to manufacture these unusual high quality bolts to exacting specifications.

This broad experience backed by a high desire to be of service to you is your assurance that Erie is ready to meet your special bolting requirements.

A SUBSIDIARY OF Barium STEEL CORPORATION

**ERIE BOLT and NUT CO.**
ERIE • PENNSYLVANIA

STUDS • BOLTS • NUTS
ALLOYS • STAINLESS
CARBON • BRONZE

*Representatives in Principal Cities.*

## Manages Los Angeles Branch

H. Raymond Hogaboom

H. Raymond Hogaboom, for many years engaged in oil field and power transmission work, has been appointed new district manager of Enterprise Engine & Machinery Company in Los Angeles. Mr. Hogaboom replaces P. B. Edwin, who has retired from active business life. Mr. Hogaboom, a graduate of the University of California, is well informed on the needs of this area with regard to diesel engine power work, having been active for many years with Pacific Gear and Tool Works, Richfield Oil Company, and in other consulting engineer capacities.

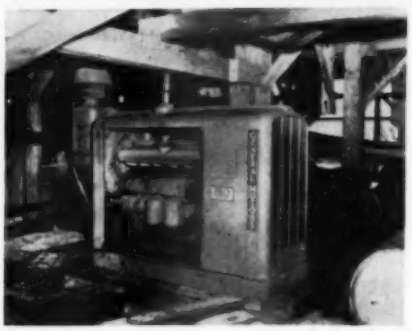
## Iowa State College Power Conference

The Third Diesel Power Plant Conference at the Iowa State College will be held July 21-23, 1952 at Ames, Iowa. The program for this conference has been built around suggestions made by operators who have attended previous conferences. Tentatively, the following subjects have been scheduled to be included in the program, improving fuel efficiency, problems of dual fuel engines, piston ring problems, crankcase explosions—their cause and prevention, demonstration on combustion analysis and indicator cards, cooling equipment and problems, water treatment, air filters, lubrication, filters and bearings (one half day panel), plant records, plant noise control, discussion of DEMA standard practices and a working session on fuel injection.

Detailed programs including housing information and registration blanks will be sent out during the month of June. All interested parties are invited to attend. For information regarding this school write Engineering Extension Service, Iowa State College, Ames, Iowa.

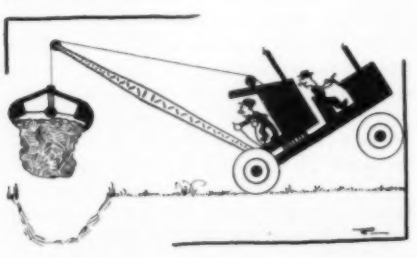
Solenoids
The Synchro-Start Solenoids are small and ruggedly constructed in a dust and splash proof case. They are used for operating throttles, fuel pump racks, chokes, anti-dieseling devices and controls.
Technical Data
Dimensions—4½" x 3⅞"
Voltages—6, 12, 24 and 32
Shipping Weight—3 pounds
10 pound pull with ½" stroke
Current Consumption—220 W pulling, 6.5 W holding
Either grounded or ungrounded
For further information ask for BULLETIN 410
SYNCHRO-START PRODUCTS, INC.
Automatic Engine Control Equipment


## Diesels Increase Production 50%



**This newly installed 2-cycle diesel takes up considerably less space than the old steam plant and has increased this lumber mill's production by 50% according to the owners.**

Conversion of a band-saw mill from steam to diesel power has resulted in a 50 per cent increase in production for the Hughesville Hardwood Corporation of Hughesville, Maryland. William T. Mayberry, president of the corporation, reports, that since the diesel was installed in July 1951, production has leveled off at approximately 40,000 board feet per nine hour day. Also reported is a better run of lumber due to the diesel's ability to operate the saw at a more constant speed regardless of sudden load increases. Easier and quicker starting is also an important feature of the new set-up, according to Mr. Mayberry. The power plant is connected to an 80-foot line shaft which runs the entire length of the mill. Power is taken from this shaft to operate a 6-ft. bandsaw, a four gang 18-in. edger, an end trimmer, cut-off saw, log elevating machinery, dipping reel, conveyors and other accessories. The engine which is a G-M model 6-110 2-cycle diesel, runs at a speed of 1650 rpm. with 5.5 to 1 reduction to the shaft which runs at 300 rpm. The shaft is belt-driven with 18 "C" belts making the connection. The installation was made under the supervision of J. K. Stull, sales engineer of the McLung-Logan Equipment Co., diesel engine distributors at Baltimore, Maryland.



# *BEST... again and again!*

**A leading Diesel manufacturer reports:**

## We were getting bearing failure in 100 hours ...until we standardized on

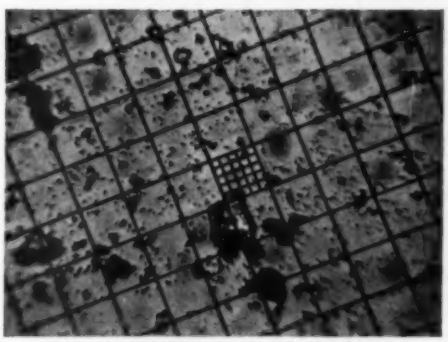
# PUROLATOR

## *FULL-FLOW*

# MICRONIC FILTERS

IN SERVICE SO SEVERE that engine bearings formerly failed in a hundred hours or less—the same Diesel equipment now operates more than a thousand hours with no visible bearing wear!

This enormous increase in bearing life—this Diesel manufacturer reports—can be credited entirely to Purolator Full-Flow Micronic* filtration. Needless to say, Purolators are now standard equipment on *all* this manufacturer's Diesel vehicles and industrial engines!



**The Purolator* Micronic** element traps dirt down to *submicrons* in size, and has many times more *dirt storage space* than old-style filters.

**Not once . . . not twice . . .** but *every time* Purolators have been tested by the world's largest and most important makers of internal combustion engines—Purolators have won top honors. No other filter is capable of delivering the high flow rates necessary for filtering *all* the oil at *each* pass—full-flow filtration—with minimum pressure drop throughout a lengthy service life. And no other filter gives dependable filtration down to *submicrons* (.0000039 in.)! The Micronic element has *ten times* the effective filtering area of old-style filters. And—size for size—no other filter provides as much *dirt storage space* as does Purolator.

Want to prove Purolator's outstanding superiority to your own satisfaction . . . on your own equipment . . . in your own way? Our Engineering Department will gladly co-operate in helping you conduct any type of comparative filter test you may prefer. Simply write, describing your equipment. *Reg. U.S. Pat. Off.

**PUROLATOR PRODUCTS, INC.**
**Rahway, New Jersey and Toronto, Ontario, Canada**
**Factory Branch Offices: Chicago, Detroit, Los Angeles**

**PUROLATOR**
**MICRONIC OIL FILTER**
"FIRST IN THE FIELD OF FILTERING"

## Inland River Reports

*By* DAVID I. DAY

THE *M. V. SARA,* formerly the *Dravo 41,* for years in the sand and gravel trades around Pittsburgh is active now part of the time pushing barges of unpolished plate glass for the Pittsburgh Plate Glass Co., Creighton, Pa. This boat has a Nelseco 425 hp. diesel engine. The boat is about 15 years old and was built at Neville Island by Dravo.

OBSERVED below St. Louis lately, the old veteran *Albert E. Heekin* of the Mississippi Valley Barge Line was receiving congratulations from rival towboats. The *Heekin* was the first boat to get through the ice all the way to St. Paul in 1952. The boat is powered with twin Cooper-Bessemers, 1000 hp.

THE NOTED *Ernest T. Weir,* another MVBL diesel boat is handling 3-barge loads of alcohol all the way from New Orleans to Kobuta, Pa. The *Weir* has been called "one of the best advertisements afloat for Superior engines." She has twins, 1300 hp.

FOR THE first time, the "champ towboat" of the upper Mississippi coal trade, the *A. M. Thompson,* has been pushing coal on the upper Ohio. At many Ohio River ports, the river clan turned out en masse to see the boat with the big Enterprise diesel twin engines, 2600 hp. The boat is owned by Central Barge Co., Chicago, and is Calumet-built.

THE OLD Engineer boat *Burnett* is now the *Union* and belongs to Valley Camp Coal Co., Moundsville, West. Va. She is regularly seen pushing coal in that part of the river system. Her General Motors (Detroit) diesel engine is giving satisfaction.

*THE M.V. HARRY TRUMAN* came down the Mississippi recently and left barges of oil which later got on fire at St. Louis causing no end of excitement for a few hours. The *Truman* is a fine workboat, G-M engines, 3200 hp. Helping extinguish the fire were the *Laguna* making speed with her engines of the same type, the old Atlas-powered *Nicholas Duncan,* built by Marietta Shipyards back in 1939; and the 1800 hp. *Huck Finn,* GM diesel twins.

THE LITTLE *Tuffy* of the Twin City Barge & Towing Company, well-known around Paducah, is now the property of Green Coal Co., Owensboro. This boat has three little G-M engines.

NICE COMMENT from Venice, La., on the work of the diesel tug *John Arthur* of the Arthur-Smith Corp., Houston, Tex. The tug is now ten years old and we hear: "The boat is being currently used by the Edwards Transportation Co., running from Venice to the mouth of the Mississippi. The engine room is a very efficient one despite the hard work of past years." The power is from a 400 hp. Atlas Imperial engine. A very similar tug the *Neptune,* also with an Atlas Imperial engine, from the same fleet is working now for the Esso Standard oil people.

THE RIVER-CANAL popular towboat *Vivian Parker* is the only river craft observed in recent days taking automobiles down the waterways. There were also a large number of trucks aboard. The barges were picked up at Cincinnati and unloaded at Houston, Tex. Capt. F. W. Mahurin is in command. The engines are General Motors, twins, 1800 hp.

WE HAD the pleasure of checking on the new M. V. *Southland* of the Southland Towing Co., Louisville and designed to tow oil for the Ash Oil Company of Louisville. The boat has a beautiful engine room, a pair of shiny new Superior engines.The boat has been doing general towing, said John W. Newbolt, secretary-treasurer of the owning company. However, her special oil barges are now ready from the Ingalls Shipbuilding Corporation, Decatur, Ala.

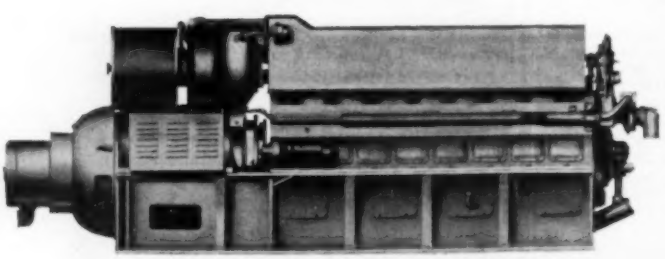
FROM J. C. Cartwright, Pittsburgh, we have a photo of the *A. V. Criss, Jr.,* pushing 11 barges of slag on the upper Ohio River. The picture is a very remarkable one from both river and background angles. This boat is better known under her old name of *Kansas City Socony.* She has twin Superiors totaling 1020 hp., and is a smooth pusher.


# STERLING offers you all three!

✓ LOW INITIAL COST
✓ LOW OPERATING COST
✓ LONG LIFE

For fifty years the Sterling Engine Company has been producing high quality light and heavy duty equipment for an ever widening variety of industrial applications.

No matter how diverse the applications, however, Sterling engines have always been characterized by the "Big Three" value that has spelled efficiency and economy to engineers and industrial users for generations.



**Sterling Viking Diesel** 8 cylinder supercharged 600 KW Generator Unit.

**STERLING ENGINE COMPANY**
*1270 Niagara St. • Telephone LI 0382 • Buffalo 13, N. Y*

## DIESEL ENGINE CATALOG

The purpose of this little advertisement is to tell you about Volume 17 of DIESEL ENGINE CATALOG which is now available, entirely revised and rewritten. This is the 17th edition of the book that has earned the name of "the bible of the industry."

All smart diesel engine salesmen carry this book around in their car. When they run into some new competition with which they are not too familiar, the DIESEL ENGINE CATALOG gives them full, accurate information when they need it most.

The consulting engineer keeps this book in his reference file. It immediately gives him *all* data on diesel engines coming within a given horsepower range, speed range and weight range.

People who sell, people who buy, people who use diesel engines need this new, fully illustrated, up-to-the-minute volume. It has been completely revised and expanded. Advance orders are now being accepted for the limited edition. Price $10.00 prepaid.

**DIESEL PROGRESS**
816 N. LA CIENEGA BLVD.
LOS ANGELES 46, CALIFORNIA

*These Fram Filcron Filters clean about 100 gallons of oil an hour at temperatures of 150-160 degrees for INVADER'S 180 hp Superior Diesel Engine.*

# "I rate FRAM 100% for any diesel owner!"

### *says fishing boat engineer*

Fram Filcron Filter installation guards diesel engine of fisherman *Invader* of New Bedford, Mass., from costly and dangerous power stoppage due to oil contaminants . . . wins praise of boat's engineer, Arnold W. Bower. Without dependable diesel operation, fishing trips are unprofitable . . . and in bad weather uninterrupted power is vital to boat's safety.

Fram Filters contribute to *Invader's* profits by reducing down-time . . . keeping the *Invader* at sea for maximum lengths of time under all conditions. And the cost of Fram protection is small. Mr. Bower states, "replacing one essential bearing would be more than a year's filtering cost. I rate Fram 100% for ANY diesel owner."

### Solve Your Filtering Problems with FRAM!

Whatever your filtering problem—lube or fuel—Fram Filters are the solution. Let Fram's Engineering Department PROVE that Fram Filters remove ALL engine-killing contaminants one micron (.000039") and larger . . . resulting in less down-time, lower operating costs for you. Make your diesels produce at lowest possible cost . . . write TODAY to the Fram Corporation, Providence 16, R. I. *In Canada:* J. C. Adams Co., Ltd., Toronto, Ontario.

**FRAM *Filcron***

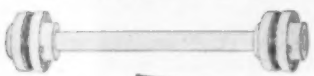
**THE MODERN OIL FILTER**

THOMAS
Flexible ALL METAL
COUPLINGS
FOR POWER TRANSMISSION
REQUIRE NO MAINTENANCE

**Patented Flexible Disc Rings of special steel transmit the power and provide for misalignment and end float.**

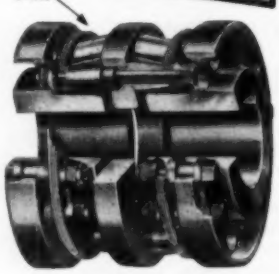
Thomas Couplings have a wide range of speeds, horsepower and shaft sizes:
½ to 40,000 HP
1 to 30,000 RPM

***Specialists on Couplings for more than 30 years***

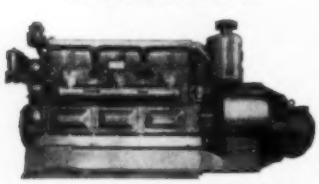


BACKLASH
FRICTION
WEAR and
CROSS-PULL
are eliminated
*Lubrication is not required!*

PATENTED FLEXIBLE DISCS



THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.
NO MAINTENANCE PROBLEMS.
ALL PARTS ARE SOLIDLY BOLTED TOGETHER.



FOR SUCH TOUGH JOBS AS: DIESEL COMPRESSOR DRIVES, MARINE MAIN DRIVES, LOCOMOTIVE MAIN DRIVES, AUXILIARY DRIVES, ETC.

*Write for the latest reprint of our Engineering Catalog.*

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

# SOMETHING FROM ALMOST NOTHING

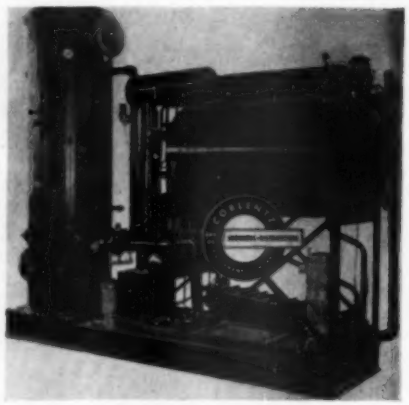
*By* ROBERT C. COBLENTZ

USING heat to create cold takes an amazing unit. Such a unit is now available to the diesel engine industry which not only operates automatically but at almost zero operating cost. The reason behind our development was to obtain a more economical and reliable source of refrigerated cooling water, because the dry coil fan type units and the red wood cooling towers do not provide cooling water at temperatures low enough for certain important applications. Even though the diesel engine is the most efficient means of converting fuel to power, more than 60 per cent of the heat in the fuel used is wasted. A part of this heat must be removed from the engine by means of the cooling water and lubricating oil. Another large portion goes out the exhaust pipe and is not used. At least 4,000,000 diesel horsepower that have been installed are not utilizing the waste heat in the exhaust gases. By using the waste heat in the exhaust a power economy resulting from the installation of an internal combustion engine can be greatly increased.

An exhaust gas boiler designed for this service has been used for years to convert this waste heat into hot water, steam generation and the heating of air. It is now possible to refrigerate water from these heat units and therefore pay substantial dividends on this investment. Coblentz engineers have assembled a complete packaged unit which requires no field assembly. This unit provides an economical source of chilled water for a wide range of applications by combining the waste heat boiler and a hermetically sealed refrigeration system on one base.

By producing refrigeration with the absorption principle (the underlying principles were recognized in the 18th century) heat is utilized as the motivating force. Generally when an absorption cycle is mentioned one thinks of an ammonia-water system but there are numerous other systems, which for their particular applications are just as practical. The water-lithium bromide system in which water is the refrigerant and an aqueous solution of lithium bromide is the absorbent, has been used in the Coblentz design and has been found very satisfactory. The refrigeration tonnage delivered is in the form of chilled water which is easily piped to external heat exchange surfaces for cooling effect. Simplicity of operation and control are the fundamental features which this type of system embodies. There are no moving parts within the absorption refrigeration unit, therefore, long life is assured with uniformally high efficiency at all times.

Illustrated is the Model IAC-25 with an hermetically sealed absorption refrigeration system. The rated capacity of this system is 25 tons of refrigration and the unit is complete with temperature controls and a chilled water circulating pump. The refrigeration produced is in the chilled water at a temperature from 40 deg. F. to 50 deg. F. using 85 deg. F. condensing water. The



exhaust gas boiler is rated for a 900 hp., four-cycle turbocharged engine. The steam system is complete with accessories and condensate return unit. Not all of the steam produced by the boiler is required for the refrigeration load, therefore, low pressure steam is available for process work, steam heating or the heating of water.

A four-cycle 350 hp. engine operating at full load wastes enough heat through the exhaust gases to deliver ample heat units to operate a 25 ton absorption refrigeration unit, therefore packaged units are assembled in different sizes. These sizes range from a unit for a 350 hp. engine with a 25-ton water chiller to a 3,500 hp. engine with a maximum of 250 tons of cooling. Larger units with variable refrigeration requirements can be assembled upon request.

During the past several years the writer has contacted a great number of engine manufacturers and engine users. This method of obtaining refrigeration with practically zero operating cost was presented to them. Cooling the combustion air on existing installations in the field that are not able to pull the rated load where the ambient temperature is excessively high was discussed in detail. The engine manufacturers were not only very enthusiastic but several large engine manufacturers have purchased this equipment and are now obtaining performance data on their engines. Engine manufacturers are also interested in the cooling of combustion air not only to increase the engine output but also to make it possible to operate both dual fuel engines and high compression spark ignition gas engines with higher supercharging and at higher ambient temperatures than has been possible up to the present time. From an article published in the December 1951 issue of a Diesel magazine, we wish to quote as follows:

"Using 90 deg. F. ambient temperature as DEMA standard rating point, for every 10 deg. higher ambient temperature, it was found that a reduction from 3½ to 5 per cent in load was necessary to limit detonation, depending upon cylinder bore size. Larger bore cylinders are susceptible to

somewhat higher deration than the smaller bore cylinders in view of the fact that the cooling jacket effect on larger bore cylinders is less than on smaller ones."

In addition to cooling the combustion air for two-cycle and four-cycle engines there is a wide range of other important applications for chilled water in industry. The three outstanding requirements for refrigerated water are for air conditioning, temperature and humidity control as well as chilled process water. We believe that there may be applications where diesel engines can be sold to not only generate power but can also be used to reduce the cost of operating a refrigeration system by using the heat from the exhaust gases. This equipment is in production and upon your written request the Coblentz Equipment Company, Erie, Pa., will be glad to forward you more detailed information regarding this method of converting waste heat into chilled water.

## Railroad Diesels

New locomotives totalling 691 went into service on our railroad system during the first quarter of 1952. All of them with the exception of three steamers and one electric, were diesel. The same period in 1951 shows that 619 new engines went into service. Of these two were steam and all the rest diesel. On order for future delivery are 1,457 locomotives. Sixteen of these are steam and the remainder are diesel.

## Worthington Names Manager

A. L. Jones

Mr. A. L. Jones has been appointed manager of the Water Treating Division of Worthington Corporation according to an announcement by W. H. Feldmann, vice president in charge of sales. Formerly manager of the sale of water treating and deaerator section of the Steam Power Division, Mr. Jones will now be in charge of sales, engineering, production and service of water treating equipment. While attending Virginia Polytechnic Institute he was commissioned a 2nd Lieutenant Infantry in the U. S. Army and was graduated from the Institute with a B.S. degree in mechanical engineering in 1920. After serving a year as a student engineer in Worthington's Holyoke, Mass. plant, he was appointed a sales engineer in the Kansas City territory. In 1924 he became an application engineer in the Direct Acting Pump and Heater Department at Worthington's Harrison plant and in 1933 was appointed assistant manager of the Steam Power Division in charge of heaters and deaerators. In 1945 he was appointed manager of the deaerator and water treating section of the Steam Power Division. Mr. Jones is a past president of the Essex County Engineering Society, a past president of the N. J. Society of Professional Engineers and is a member of the N. J. State Board of Engineering Examiners.

## Twin Disc Facilities

Consistent with the new facilities provided by The Twin Disc Clutch Company at the Newark and Dallas locations, the factory branches at Los Angeles, Seattle and New Orleans now provide enlarged repair shops and stocks of repair parts. Complete replacement units are also stocked for emergency requirements. All expansions, both plant and branch, include large areas of extra space which will permit future growth. The expansion program has also been accompanied by the rapid growth of Twin Disc hydraulic product dealer organizations which sell and service hydraulic couplings, including Hydro-Sheave and Hydro-Wynd drives, and of Twin Disc parts stations, which have competent field service men as well as adequate stocks of parts for servicing Twin Disc units in their area. Parts stations are located throughout the United States, Canada, and in England, with additional sales representation in Belgium, Holland, France, Switzerland, Puerto Rico and Venezuela. With its eight factory branches, 75 hydraulic dealers and 60 parts stations, Twin Disc now has well established an extensive sales and service organization for the convenience of owners of Twin Disc equipped units in all active territories.

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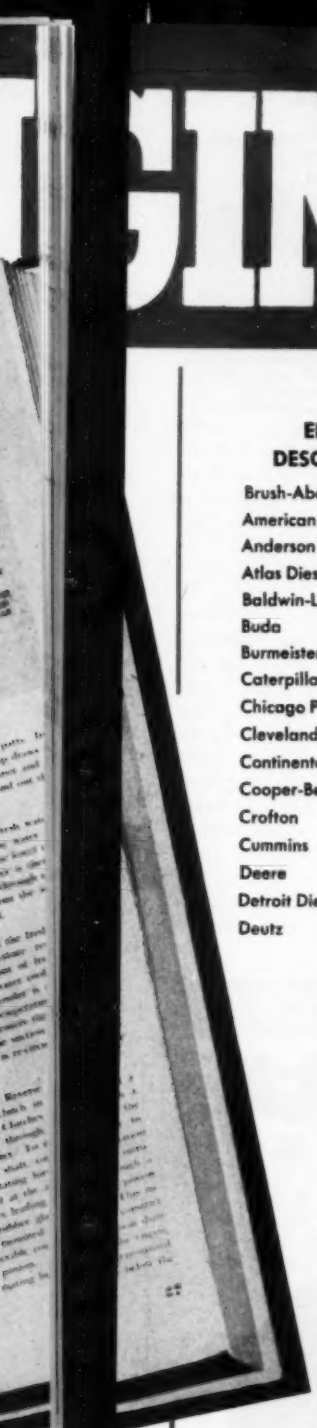

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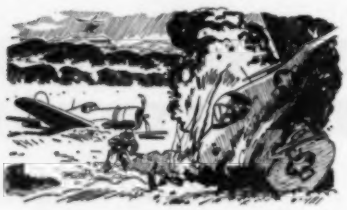
IT WAS A BRIGHT EARLY DECEMBER DAY and Lieutenant Hudner was flying a Korean combat mission alongside another plane piloted by Ensign Jesse Brown. A burst of flak caught the en-



sign's plane and he went spinning down, aflame. Despite the presence of enemy ground troops, Lieutenant Hudner then deliberately crash landed near his flame-trapped shipmate. He radioed for help, after which he fought to keep the fire away from the fatally injured ensign until a rescue helicopter arrived. Today Lieutenant Hudner has something to say to you:

"Maybe if America had been strong enough to discourage aggression two years ago, my friend, Jesse Brown, might be alive right now. So might thousands more of our Korea dead.

"For it's only too sadly true—today, in our world, weakness invites attack. And *peace is only for the strong.*

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Editor—DIESEL PROGRESS

### Reduces Wet Sleeve Pitting

Reduction of wet-sleeve pitting in industrial diesel cooling systems by as much as 70% through application of the Perry cooling system filter, is announced by the manufacturer, the Spark-O-Liner Corp. Pitting, caused by galvanic action in minute areas not adequately protected by rust inhibitor film, is eliminated through a cathodic current generated by the filter. This current, while small, is sufficient to induce the forces of corrosion to attach "sacrificial" corrosion-resistor plates in the filter, which are more vulnerable than metals in the cooling system.

Described as a marked improvement over the use of conventional chemical additives alone, the replaceable element-type Perry filter combines best known means of counteracting the unfavorable water conditions encountered at most construction, mining and drilling sites. The manufacturer states rusting, pitting, hardness deposits, acid or alkaline conditions, and insoluable impurities, are controlled by a combination of mechanical filtration, chemical additives, and electro-chemical protection. A synthetic zeolite exchange bed removes mineral hardness and dissolves previously deposited scale; insoluable particles are filtered out of the circulating coolant. Acid or alkaline conditions are neutralized by a buffering agent added to coolant during filtration from the chemically activated element. Both chemical and electro-chemical methods are used to combat the more complex problem of corrosion.

***Left.*** **Cylinder sleeve after 72 weeks use with soluable oil rust inhibitors only.** ***Right.*** **Same type cylinder used in engine with the Perry cooling system protection since original purchase.**

The Perry filter is available in three models, with capacities adequate for systems of from five quarts to fifty gallons. In cases of extremely unfavorable water, or for larger engine models, multiple filter installations are recommended. Further information on the Perry filter is available from the company's representatives or write DIESEL PROGRESS, File 98, Box 8458, Cole Station, Los Angeles 46, California.

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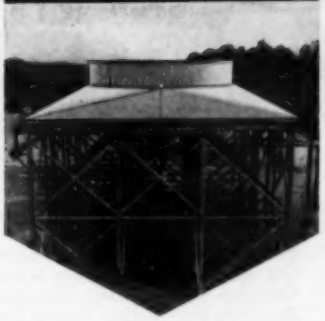

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## Florida Diesel News

*By* ED DENNIS

JACKSONVILLE Yacht Storage Co. did a fine engineering job for the Buccaneer Line repowering the twin screw freighters *M.V. Privateer, Corsair* and *Buccaneer,* with 190 hp. Murphy diesels at 1200 rpm.; 3:1 reduction gears. These reconversions have proven so successful that it is tentatively planned to convert a fourth member of this colorful fleet, the *Jolly Roger,* in the fall. This fleet is engaged in shipping between Jacksonville and island ports in the Caribbean.

COLUMBIA Fish Co. of Fort Myers Beach reports they have a 150 hp. Lathrop with Capital reduction gears, Twin Disc "power take" off, Leece Neville starters and generators, Surrette batteries, in their shrimp trawlers, *Miss Columbia* and *Blue Bell.*

CUMMINS Diesel of Florida reports 2 model HM600 diesels to be installed at Jones Boat Yard in the yacht *Nan-C* with fresh water cooling. W. T. Price of Coconut Grove, owner.

ANOTHER Fairbanks Morse installation built to last, is the Puritan Dairy of Miami. As the local power is not dependable during tropical storms, 4 Fairbanks Morse diesels were installed; two 120 hp. one 75 hp. and a 40 hp. with General Electric and Fairbanks Morse generators 3 Vilter air compressors for starting, double pipe condensers is used for cooling.

PACITTI & SONS of St. Augustine, operators of a fleet of 10 shrimp trawlers, have 2 Murphy diesels, 2 110 G-M's, 1 6-71 G-M and 5 Caterpillar D 13000's.

VISITED the *Clavern,* a 146x20 shrimper, while it was docked at Jones Boat Yard, 2 G-M 500 hp. diesels pushes it at about 14 knots, has Marquette governors, a G-M 3-71 for the light plant also a Westinghouse generator hooked in line with the port engine for the deck winch. 2 Gardner Denver air compressors, Curtis refrigeration compressors and Continental electric motors for the brine tanks.

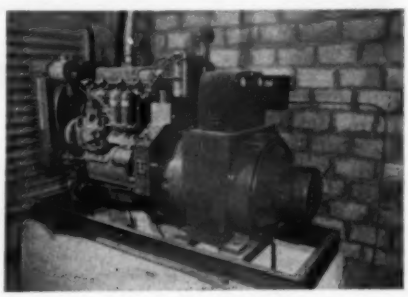
A NEW 57x16 tow boat for the Howard Backus Towing and Marine Co., to be used on the East Coast, a D-397 Caterpillar 400 hp. with Falk 4:1 reduction gears and a 70x46 Columbia propeller, expected speed of 12 mph., a Worthington air compressor. Made of Florida yellow pine; sister tow boats are the *Victory* with a D-364 "Cat" and the *Atlas* with a D-8800. All installations were engineered by Shelly Tractor and Equipment Co.

EVERGLADES National Park is the recipient of three 26x9x2 sightseeing launches with hulls built of fiberglass by Cape Cod Shipbuilding Co., to be used among the islands and rivers of the southwestern part of the park. Two Kermath Model 4-226 and one Model 248-ID with Paragon clutches will move them at 12 knots. Exide batteries are used. More launches will be added in the near future.

THE Seaboard Railroad speeded up its dieselization program, according to a recent report, they received 51 diesel engines in the last year with another 31 on order. To date at the Hialeah repair shops they have over 250 persons employed servicing both Baldwin and Electro-Motive diesel locomotives. The report added that in a very the past due to the greater efficiency and economy short while steam locomotives will be a thing of of diesel locomotives.

PURE white are the two Model 32 E-14 Fairbanks Morse generating units at the Holsum Bakery in South Miami; two Fairbanks Morse 250 kw. Model TG-20 generators, Ingersoll-Rand air compressors and Maxim silencers, over 6,000 hours and no overhaul, engine bed is 10 ft. of solid poured concrete and steel.

RECENTLY installed at the Little River branch of the First Federal Savings and Loan Association is a Model RD-9 A-18 International Harvester Ready Power unit. In the event of a power failure it will be responsible for the burglar alarm system and lights as well as the current to the huge vaults.



Complete with a Ready-Power 35 kw. generator 120-208 volts, a radiator is used for cooling; Delco Remy starters and generators, Maxim MU-3 heavy duty silencer for the exhaust system, and an automatic battery trickle charger maintains the starting batteries fully charged at all times. A louver in front of the radiator and in the rear of the building is used for ventilation and acts as a pressure release during a hurricane. Supplied and installed by Florida Georgia Tractor Co.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## Dallas Sales Engineer

Wayne G. Slife

Appointment of Wayne G. Slife as sales engineer in the Dallas, Texas, office of the Heavy Machinery Division is announced by R. W. Bayerlein, vice president, Heavy Machinery Division, Nordberg Manufacturing Company, Milwaukee 1, Wis. Born in Pittsburgh, Pa., Mr. Slife received his early education in Oak Park, Ill. He then attended the University of Illinois and in 1942 enlisted in the United States Army Air Corps. Following training, he received his commission as a 2d lieutenant and served as a pilot in the Western Training Command and the 4th Air Force in the United States. In 1946, following his honorable discharge from service as 1st lieutenant, Slife was named general manager of an electrical and industrial equipment company in Cedar Rapids, Iowa. He retained this position until July 1948 when he became associated with the Elliott Company as a field engineer handling that firm's municipal and industrial business in the southwest. He resigned this post in April 1952 to join Nordberg Manufacturing Company.

## Elected Vice-President

Donald H. Vance

Donald H. Vance has been elected vice president of The Korfund Company, Inc., Long Island City, N. Y., manufacturer of vibration and shock control mountings for heavy marine and industrial equipment, it was announced by Mr. S. Rosenzweig, president and board chairman. Mr. Vance, a graduate of the University of Michigan, joined the Korfund Company in 1941 and has served as executive engineer and assistant general manager.

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74 new Nordberg Radials have recently been added to the original 120 in this vast plant. Each is equipped with two 12 feed Manzel Model 82 Force Feed Lubricators . . . a total of 388 "guardians" to insure the correct lubrication of engine cylinders. With their unfailing regularity and accurate metering of oil, Manzel Lubricators drastically reduce labor, maintenance, and overhead costs.

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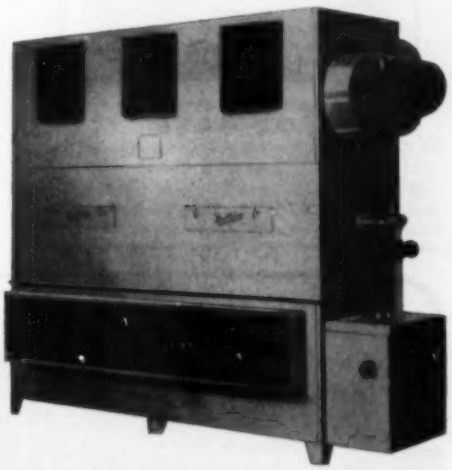

The "Buffalo" Evaporative Water Cooler requires minimum space. Its 3-sectional design permits moving the unit into your building through standard doorways, or it can be furnished for outdoor installation. The cooling principle is simple and positive. Jacket water is pumped through spiral fin coils which are wetted by fine spray. Evaporation on the coil surface does the cooling. Jacket water is held very close to the desired temperature. Maintenance and operation is simple. For further information on efficient liquid cooling by water evaporation, write:

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# IH Mobile Schools

A pair of traveling International Harvester mobile schools on industrial power products are again on the road. These mobile training units are two large truck and trailer units each equipped with training aids of all descriptions. Each has been completely refurbished with new cutaway diesel engine and tractor chassis assemblies, slide films, charts, and other material for the new 1952 tours. These units will continue and expand the program, begun by International Harvester in 1951, of presenting service and technical information on International industrial tractors and engines to IH distributor personnel and to their contractor customers, as well as to the armed forces and engineering schools.

The big truck and trailer units housing the equipment for these schools, traveled a total of 31,758 miles during eleven months of 1951. Programs were presented at 153 meetings to 20,283 people in the United States and Canada. Almost 1,000 armed forces personnel attended the special sessions put on for them by the IH mobile training units, and 1,186 public employes—state, county, and municipal—also attended the presentations. Designed primarily to improve and renew service techniques of IH industrial distributor personnel, the units rpesented refresher programs for 5,461 distributor employes and for nearly 10,000 customers and customer employes. Nearly 2,000 of International Harvester's district office employes attended courses during visits of the mobile units, and students in engineering schools and colleges accounted for 1,165 additional viewers of special programs designed for their particular needs.

**Distributor servicemen listen intently to an IH mobile training unit instructor as he explains the design changes and latest service techniques for crawler tractor transmissions.**

International Harvester's assistant general sales manager, I. P. Payne, believes that the mobile training units are one of the most important services the company has ever provided for its industrial distributors. According to Payne, the reaction of all who have seen the programs has been enthusiastic. As in 1951, the two mobile training units will make the Mississippi river their operational dividing line with Unit No. 1 taking care of the eastern half of the country, while Unit No. 2 will cover the West. All of the instructors with these uints have spent several months in IH's special training course which prepares them for this work.

## West Coast Representative

Titeflex, Inc., manufacturers of a complete line of electrical connectors, flexible metal hose and shielding conduit, rigid and flexible waveguides and expansion-type bellows, has announced the appointment of William Buckley as west coast sales representative with offices at the Salsbury Corporation, 1161 East Florence Avenue, Los Angeles, California. Sales manager and head of the New Electronics Division, with offices in Newark, New Jersey, is Robert G. Brazenor.

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NATIONAL WELDING & GRINDING CO. 2939 CANTON ST. DALLAS 1, TEXAS

## West Coast Diesel News

*By* FRED M. BURT

TO POWER 80-ft. purse seiner *Patriotic*, owner John Ryono, San Pedro, a 275-hp., V-8, Caterpillar marine diesel engine from Shepherd Tractor & Equipment Co., driving through 3:1 Snow-Nabstedt hydraulic reverse and reduction gears.

POWERED WITH Cummins diesel engines—for H. B. Adair Construction Co., Gardena, Calif., two new Woolridge Terra Cobras (225-hp.); Lamb Transportation Co., Long Beach, four Autocar trucks (200-hp.); Asbury Transportation Co., Los Angeles, four Mack buses (200-hp.)

FROM Oswald Machine Works, San Francisco, a 6-cyl. 150-hp. Murphy diesel engine to repower a California Dredging Co. dredge in use reinforcing levees along the Sacramento River.

PURCHASED THROUGH Albuquerque office of Reynolds Electrical and Engineering Co. (El Paso) two new 500-kw. Union diesel-generating sets for power on highly secret government work in Kentucky; power from P6 Union diesels; generators, exciters and auxiliary motors from Ideal Electric & Mfg. Co., Mansfield, Ohio.

THE 41-FT. fishing boat *Janie W* designed by Jake Eremenko, Ft. Bragg, Calif., is powered with a 3-cyl., 100-hp. General Motors diesel engine from Hall-Young Co., San Francisco; also having a Twin-Disc front power takeoff.

FOR USE IN Folsom (Calif.) Dam construction work a 100-kw. Murphy diesel-generating set purchased by Merritt-Chapman & Scott Co., contractors, from Oswald Machine Works.

NEW ADDITION to Monterey Bay fishing fleet is the 40-ft. *J. A. Russo*, powered with a 225 Gray diesel engine; built entirely by owner J. A. Russo.

TO REPLACE electric motor power, two 170-hp. Chrysler Industrial engines converted for natural gas fuel by Engine Sales and Service, Los Angeles, were purchased by Cucamonga (Calif.) Irrigation Service to drive Peerless deepwell pumps equipped with dual drive Amarillo pump heads.

THE COMBINATION boat, 61-ft. *North Head;* owner Frank Spengler, Berkeley; skipper, Dale Miller; has been re-powered with a P & H 138-hp. marine diesel from Parker Diesel Engineering Co., Oakland.

NEW PERSONNEL for Cummins Service & Sales, Los Angeles—John W. Tucker, manager of industrial sales, formerly Hall-Scott Motor sales manager in Los Angeles; Fritz Engel, formerly shop foreman, is now Maintenance Adviser, doing 100% field work to assist Cummins diesel engine owners in obtaining continual peak performance.

FOR SAN DIEGO Gas & Electric Co. for use in connection with underground natural gas storage, a Cooper-Bessemer 1250-hp., 4-cyl. two-stage compressor.

SUPPLIED by Frazier-Wright Co., Los Angeles (through Koepsel & Love, Salt Lake City, Waukesha dealer) to power a portable, hot asphaltic plant, a 6-cyl. 250-hp. Waukesha diesel engine driving a 125-kw. Westinghouse generator.

FROM Buda Engine & Equipment Co., Los Angeles, a 150-hp. Buda diesel to power a Sutorbilt positive displacement blower for use in an aircraft test unit at a major Southern California aircraft plant.

RE-POWERED with a new 165-hp. General Motors diesel from Crofton Diesel Engine Co., San Pedro, is the *Northern Isle* (formerly the *King Phillip*), skipper Knut Pederson, fishing for Monterey Canning Co., from Moss Landing, Calif.

PURCHASED by Bascomb Mining Co., Reno, Nev., from Engine Sales & Service, Los Angeles, a diesel-generating set (a 165-hp., 6-cyl. Murphy diesel engine direct connected to 100-kw. Electric Machinery generator) for use at their Vida, Nevada, tungsten mine, one of the most promising tungsten developments yet found in Nevada.

AT THE General Motors Detroit Diesel Engine Division plant in Detroit, Robert J. Heinz, Sales Engineer, for Anderson-O'Brien Co., Los Angeles, was recently awarded a diamond ring for placing first in Detroit Diesel engine sales in 1951 in the Arizona, California, and Nevada zone.

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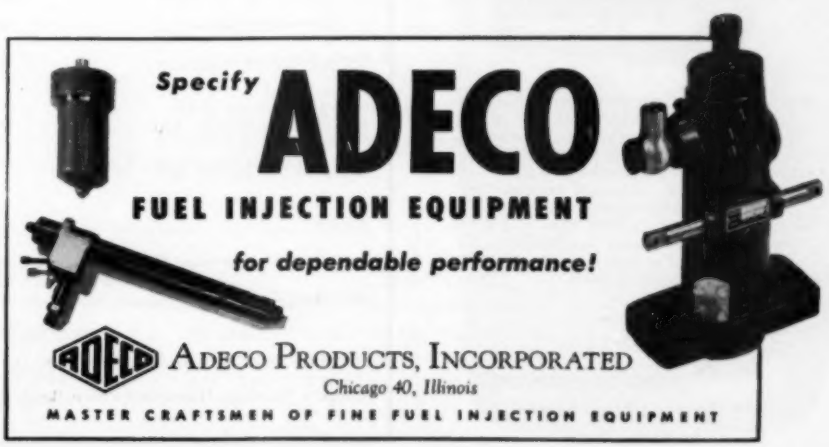

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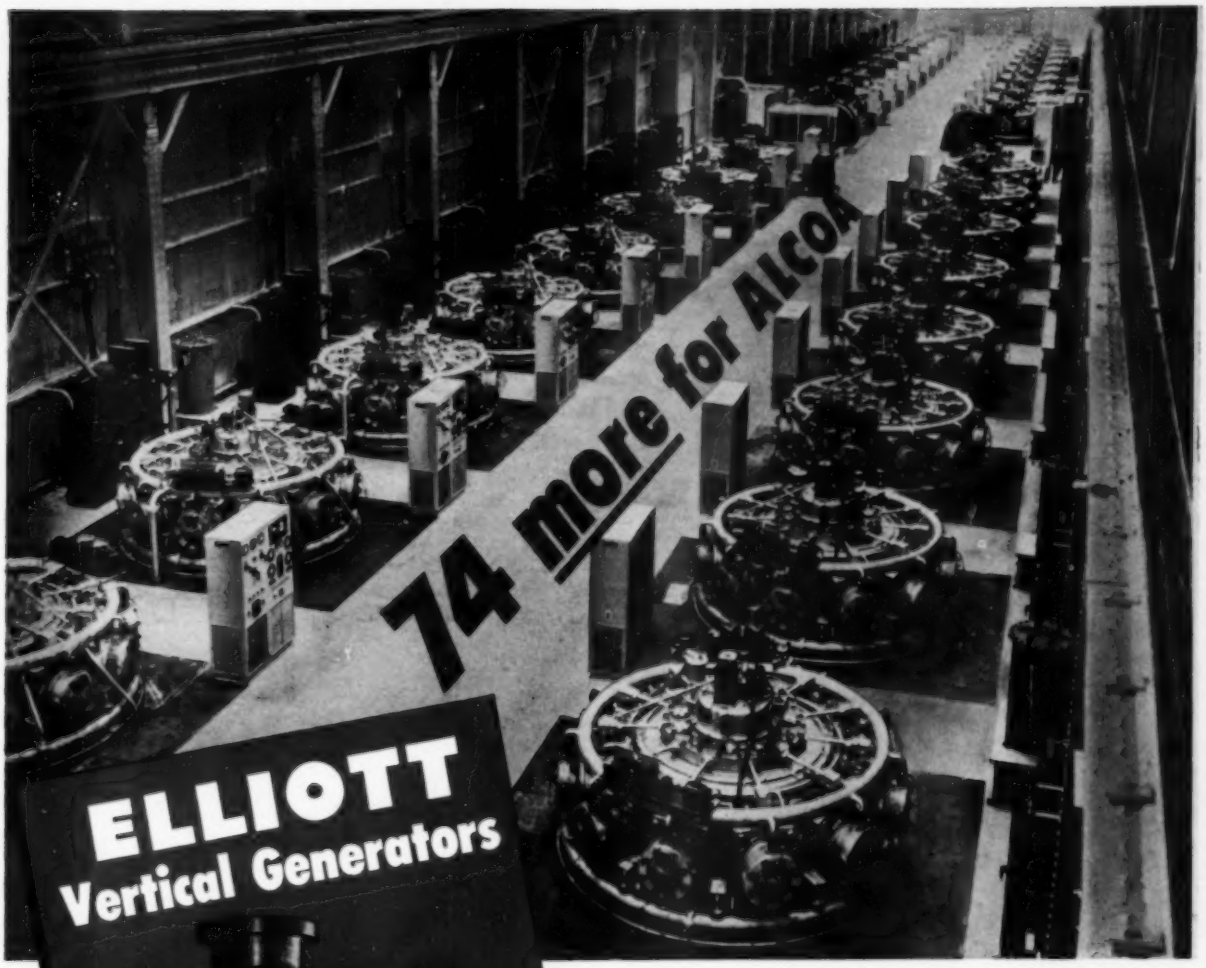


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